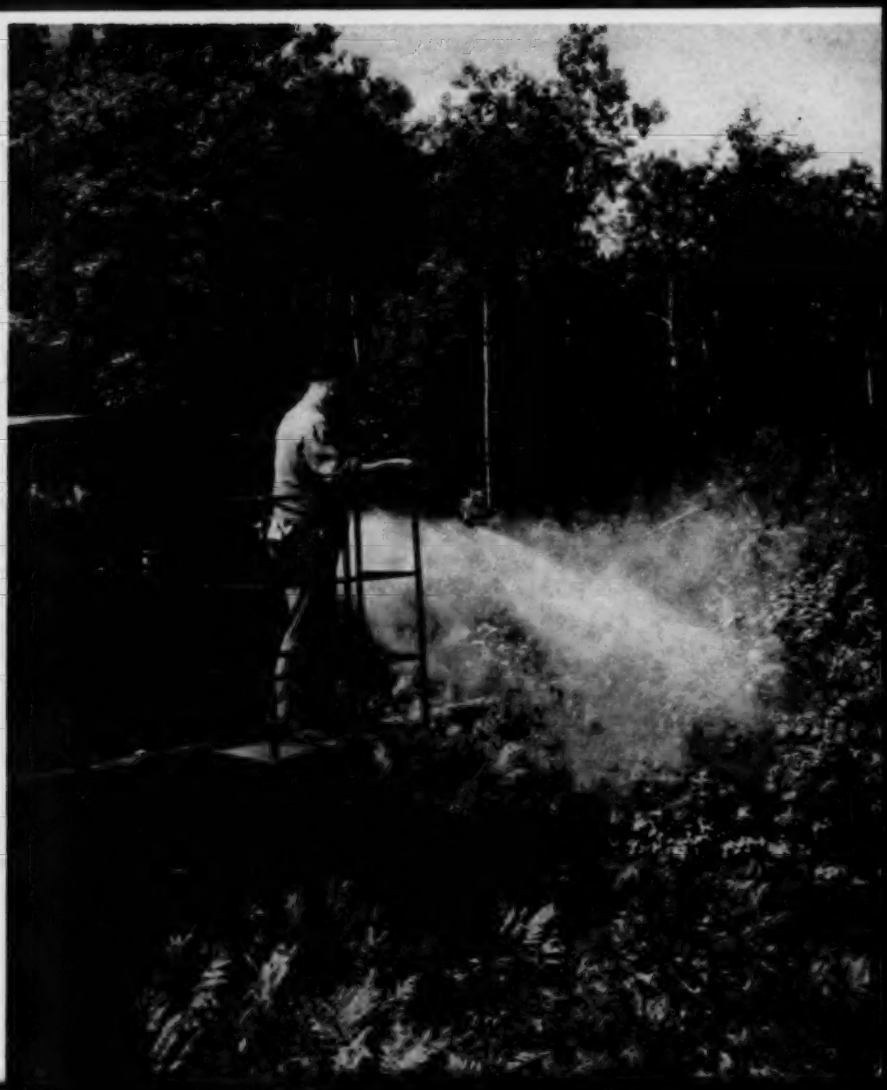
AGRICULTURAL CHEMICALS



WHAT'S AHEAD IN INSECTICIDE SUPPLIES?

Today—the supply picture changes from month to month; you seldom can foresee more than a few months ahead.

Scare buying and inventory pile-ups are no answer; they just introduce new problems. The best answer—the answer that has worked year after year—is *contract buying*.

Contract with us for your future requirements. We will earmark your *next season's supply* . . . assure you of *first call* on supplies available then . . . give you *full and complete price protection* to time of delivery—existing customers, of course, being served first.

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GREEN PASTURES

The Green Pastures movement is spreading over the American countryside increasing both the value of the land and the production of livestock.

Through the cooperation of the County Agents, Extension Services, Colleges and Fertilizer Manufacturers, this program is developing rapidly. P.C.A. is proud to have a part in furthering the growth of Green Pastures.

POTASH COMPANY OF AMERICA
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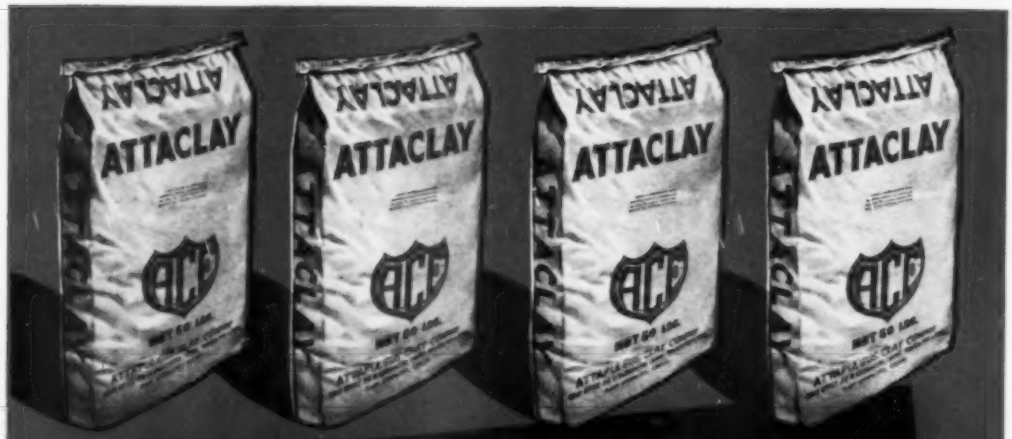

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Today, Attaclay—the unique carrier and diluent—is used by practically all of the nation's larger producers of pesticide dust concentrates.

There are good reasons why. When free-flowing, highly sorptive Attaclay is in the formula, the capacity of mills—and that of the rest of the dust-handling equipment—goes up as much as 50%. Attaclay transmits its own natural fluidity and lump-free fluffiness to the product, making each item more desirable—more sellable. Which is another way of saying that Attaclay has proven its ability to reduce production costs, improve products, widen profit margins.

Blenders, too, recognize Attaclay's advantages. In the months to come—when they extend concentrates to field-strength dusts—Attaclay, applied as diluent, will continue to reshape ideas of what a fine, non-abrasive finished dust should be.

So, if you have a carrier or diluent problem and want to be sure of solving it *profitably*, discuss it with us. We will gladly provide a generous working sample of Attaclay and technical help.

ATTAPULGUS CLAY COMPANY

Dept. A, 210 West Washington Square, Phila. 5, Pa.

AGRICULTURAL CHEMICALS

THIS MONTH'S COVER

Application of herbicides for control of brush is now accepted practice. Here 2, 4, 5-T is being applied to clear a right-of-way. (Photo by Dow Chemical Co.)

VOL. VI No. 9
SEPTEMBER 1951

A Monthly Magazine For the Trade

•

LAWRENCE A. LONG
Editor

THOMAS MORGAN
Advertising Manager

•

In This Issue:

AGRICULTURAL CHEMICALS

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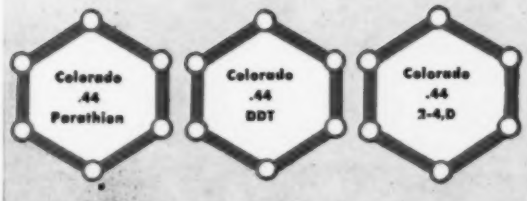
The insecticide business is more than an early spring and summer business to aggressive dealers. Many dealers sell as much late in the season as they do earlier. Now is a good time to learn about finer Colorado .44 formulations of America's most effective insecticides. Get your late-season stocks from Colorado .44! A phone call, a wire or a letter will bring you complete information and prices.



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Rush information on the Colorado .44 late season insecticides and the Colorado .44 dealer plan.

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Alcoa Cryolite is a standard, high-power insecticide, approved by state experiment stations. It is compatible with insoluble-type copper compounds, sulphur and other neutral fungicides, insecticides and diluents. Its properties are dependable and can help make your insecticide *better*.

THESE DISTRIBUTORS CAN SUPPLY YOU WITH ALCOA CRYOLITE

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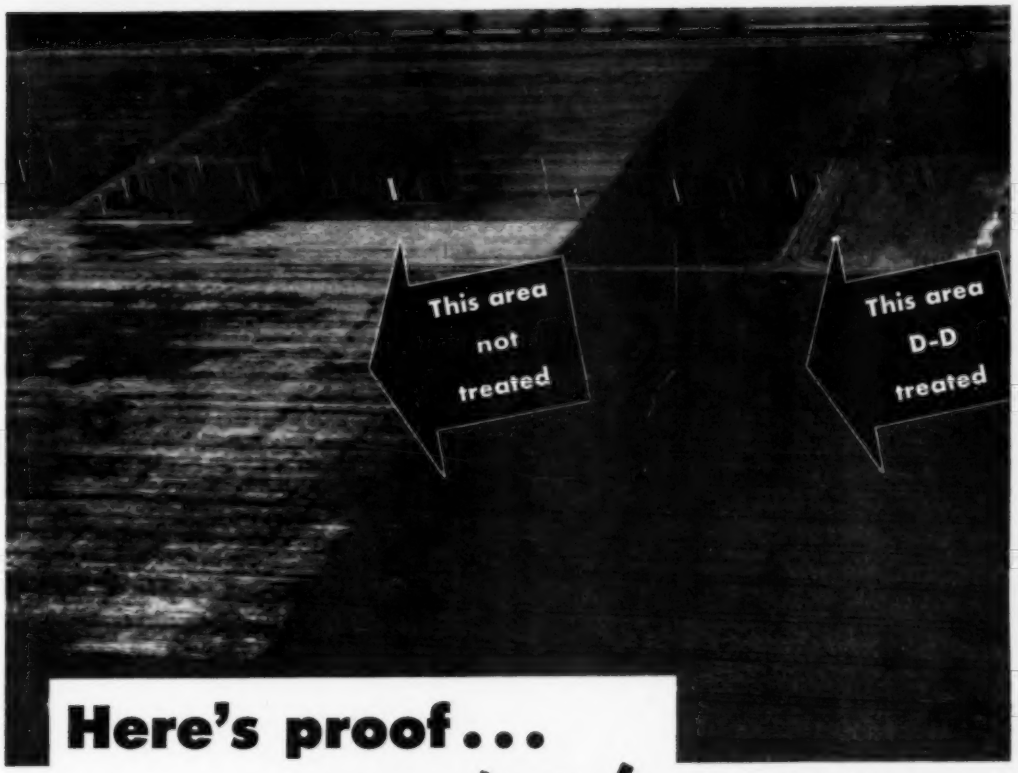
For further information write to ALUMINUM COMPANY OF AMERICA, CHEMICALS DIVISION, 641 Gulf Bldg., Pittsburgh 19, Pennsylvania.

This is a celery field



Last year this field had a poor crop of celery. This year the D-D treated land is yielding a bumper crop. The owners credit D-D unreservedly for the difference.

Here's proof . . .

that soil treatment with D-D pays

Operators of American Fruit Growers Farm in Sanford, Fla., suspected nematodes as the cause of their poor celery crop last year. They ran a D-D* test *this* year to make sure.

Right part of field—treated with D-D before starting crop;

Left part—not treated with D-D;

Whole field—planted and cultivated in exactly the same manner.

The results of the test are plainly shown in the photo. Nematodes *were* the reason behind last year's bad celery! U.S.D.A. nematologists found both the sting and stubby root species of nematodes† in the roots of the scrawny untreated celery.

Celery is just one of many Southern crops attacked by nematodes. Root knot, sting and stubby root nematodes are present in most soils . . . are often the pests behind poor yields and lost profits.

D-D kills nematodes!

D-D injected into the soil before planting, rids your land of nematodes and other soil pests for the season . . . allows plants to develop healthy wide-ranging root systems and the sturdy plant structure that means a profitable crop.

American Fruit Growers Farm now boosts D-D. Wouldn't you?

***D-D**
a soil fumigant, Trade Mark Reg. U. S. Pat. Off.

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CHEMICAL PARTNER OF INDUSTRY AND AGRICULTURE

EASTERN DIVISION: 500 FIFTH AVENUE, NEW YORK 18

†Sting nematode: *Belonolaimus gracilis*
Stubby root nematode: *Trichodorus sp.*

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Finely powdered products will not sift through a Fulton W.P.P.L. Bag. Even moisture or outside vapors from gaseous materials will not penetrate the tough lining of paper or plastic that is laminated with adhesive to the inside of this sturdy bag.

Made of either cotton or burlap, Fulton W.P.P.L. (Waterproof Paper Lined) Bags are ideal containers for export or domestic shipments of hygroscopic materials, and products to be protected from outside influences. Many manufacturers who formerly used rigid containers are finding this tough, flexible, easier-to-handle textile bag a more advantageous and economical package for their products.

Investigation might prove it's the best container for your product. Just drop a line to the Fulton branch nearest you for full information.

Growing constantly in popularity with industry's largest users of paper bags—Fulton's famous Multiwalls. All types—pasted or sewn bottom, open mouth or valve. Fulton makes the Multiwall to fit your product!

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Bad News for Bugs

BUGS are in for the surprise of their lives. *They're going to zoom into allethrin, the new insecticide ingredient. It looks like especially bad news for many of the insects that pester you most.*

Take flies, mosquitoes and gnats . . . allethrin's paralyzing touch searches them out . . . delivers the blow that knocks them down fast . . . leaving its slower acting companion ingredients in the spray or powder to complete the kill.

Until now this type of insecticide came from flowers picked by the natives in Asia and Africa. But *allethrin is an all-American product,** synthesized under scientific controls and has the definite advantages of uniformity in strength and quality.

It is only natural that the people of Union Carbide pioneered in the production of allethrin on a commercial scale. For they were already making most of the needed chemical ingredients.

As a result, Union Carbide is already providing allethrin in ever-increasing quantities to manufacturers of household and dairy sprays and aerosol bombs. Researchers all over the country are now engaged in testing allethrin for the control of agricultural pests and for other purposes.

**THE FORMULA* *and first laboratory production of allethrin were discoveries of the U. S. Department of Agriculture. Extensive testing of the new chemical was done by the Boyce Thompson Institute. First commercial production of allethrin was an achievement of the people of Union Carbide.*

THE FREE BOOKLET *"Products and Processes" will tell you about many other interesting achievements in science and industry made possible by Union Carbide's* ALLOYS, CHEMICALS, CARBONS, GASES, *and* PLASTICS. *Write for booklet CP.*

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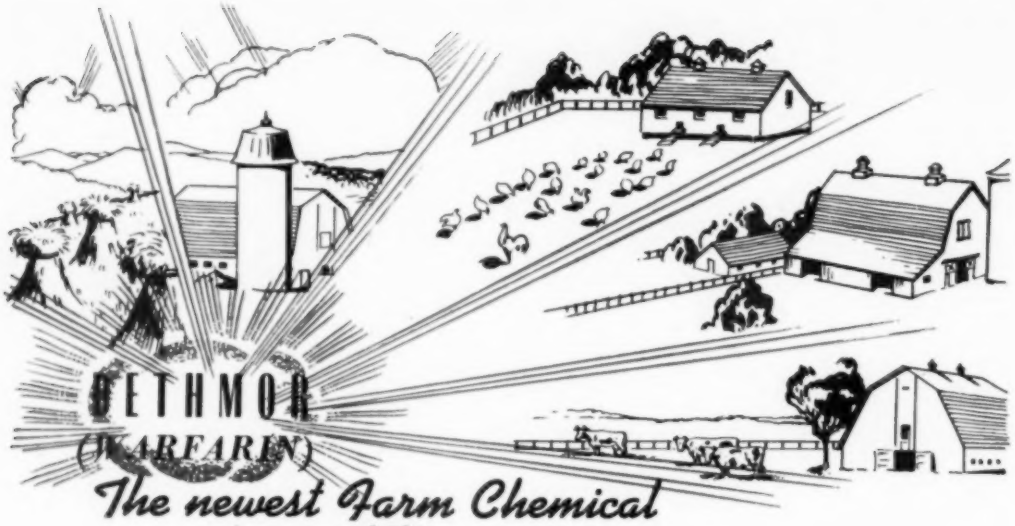

This remarkable new rodenticide has proved its worth to millions of farmers in ridding their farms of rats and mice.

Our new 36-page booklet, "A Year's Experience with Dethmor," presents impressive evidence of the effectiveness of warfarin as established during the past year. Write for a free copy.

NOTE: For those who prefer to distribute an established small package line—write for our list of repackers.

Our warfarin product Dethmor is sold in bulk to repackers for sale under private label. Most distributors also offer finished (ready-to-use) bait.

★

The county agents are familiar with warfarin. Many are scheduling rat control demonstrations for the fall months—others have planned county-wide rat control campaigns. Packers of warfarin baits will benefit from this increased activity and the general awareness of the importance of rat control on the farm.

Why not add this profitable rodenticide to your line of agricultural chemicals?

S. B. PENICK & COMPANY

50 CHURCH STREET, NEW YORK 7, N. Y.
Telephone, Cortlandt 7-1570

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LION provides one-stop nitrogen service to Southern fertilizer manufacturers

Lion Anhydrous Ammonia — Manufactured in Lion's modern plant to an 82.25% nitrogen content under accurate chemical control, the uniformity and high quality of this basic product are assured.

Lion Aqua Ammonia — This product is available to manufacturers for use in the formulation of mixed fertilizers or for sale as direct application material. Normally about 30% ammonia, its content can be controlled by order to suit your needs.

Lion Nitrogen Fertilizer Solutions — Made specifically for the manufacturing of mixed fertilizers, these products supply both ammonia nitrogen and nitrate nitrogen in the ratios desired. They are easily handled and available in three types designed for varying weather conditions, and for formula requirements in the production of fertilizers that cure rapidly, store well and drill evenly.

Lion Ammonium Nitrate Fertilizer — The improved spherical white pellets in this product contain a guaranteed minimum of 33.5% nitrogen. They flow freely, resist caking and store much better. Lion Ammonium Nitrate Fertilizer is shipped in 100-pound, 6-ply bags with two moisture-proof asphalt layers.

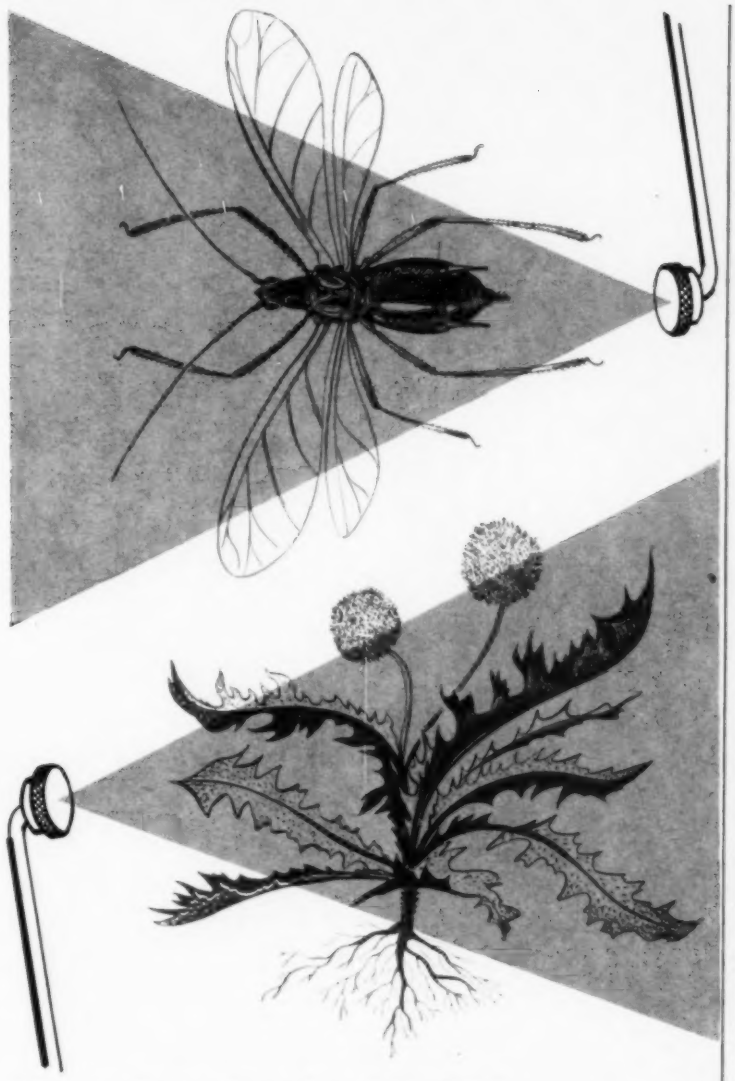
Lion Sulphate of Ammonia — This new, superior-type sulphate is guaranteed to contain a minimum of 21% nitrogen. Through special conditioning of the larger crystals, moisture and free acid content is greatly reduced. These factors, together with the special coating applied, make for greater resistance to caking in shipment or in storage. This product flows freely. It is shipped in bulk and in 100-pound, 6-ply bags laminated with asphalt.

"Serving Southern States"

Technical advice and assistance to fertilizer manufacturers in solving their manufacturing problems is available for the asking . . . just write.

LION OIL COMPANY

Chemical Division • El Dorado, Arkansas



Now Get Ready for '52

This is the time of year when formulators are casting up accounts of the past season and turning thoughts to 1952. Now and in the next few months, they will be mapping strategy for next season's battle against insects and weeds. Increasing numbers of formulators are turning to Monsanto as their supplier of chemicals for insecticides and herbicides.

In this period of scarcities and uncertainties, it is good business to establish a line of supply well in advance of delivery to protect your business and to make sure you get your share of available materials.

Check now with your nearest Monsanto Sales Office regarding (1) availability of insecticidal and herbicidal chemicals and (2) for technical assistance in formulating. MONSANTO CHEMICAL COMPANY, Organic Chemicals Division, 1700 S. Second St., St. Louis 4, Missouri.

INSECTICIDAL CHEMICALS

Ortho-DICHLOROBENZENE
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SANTOBANE* (DDT)

SANTOCHLOR*
(para-Dichlorobenzene)

SANTOPHEN* 20
(Pentachlorophenol, Tech. Penta Preservative)

TRICHLOROBENZENE,
Technical

NIFOS*-T
(Tetraethyl Pyrophosphate, Tech., for agricultural use only)

NIRAN*
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2,4-D SODIUM SALT

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2,4,5-T ACID

2,4,5-T ISOPROPYL ESTER

SANTOBRITE*
(Sodium Pentachlorophenate, Tech.)

SANTOPHEN 20
(Pentachlorophenol, Tech. Penta Weed Killer)

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**Reg. U. S. Pat. Off.*

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SERVING INDUSTRY ... WHICH SERVES MANKIND

FIGHTING THE BATTLE OF THE COTTON PATCH

Just as Niagara chemicals protect cotton acreages, other Niagara insecticides and fungicides are employed in every phase of agriculture.

At least sixteen million bales, or sixty percent more cotton, must be produced this year to fill the rising needs of national defense, added to heavy domestic and foreign requirements. Each year common insects, the saboteurs of the cotton crop, normally destroy one out of every seven bales grown. Cotton-insect control thus becomes more critically important than ever before. In assisting a large and growing number of cotton planters, FMC's Niagara Chemical Division provides the finest scientifically formulated and tested insecticides for controlling all major cotton insects that threaten this nation's vital material.

Niagara CHEMICAL DIVISION

FOOD MACHINERY AND CHEMICAL CORPORATION

MIDDLEPORT, N. Y. • Richmond, Calif. • Jacksonville, Fla. • Tampa, Fla. • Pompano, Fla. • New Orleans, La. • Greenville, Miss. • Harlingen, Tex. • Pecos, Tex. • Canadian Associate: NIAGARA BRAND SPRAY CO., LTD., Burlington, Ontario

WHEN YOU BUY Niagara YOU BUY PROTECTION

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A NEW SUPPLY OF POTASH WILL FLOW FROM

DUVAL

Sulphur and Potash Company

upon completion of its

NEW PLANT AND REFINERY

now under construction at

CARLSBAD, N. MEX.

ANTICIPATED PRODUCTION DATE

LATE WINTER OR EARLY SPRING, 1952.

MORE DEFINITE INFORMATION WILL BE FURNISHED AS AVAILABLE

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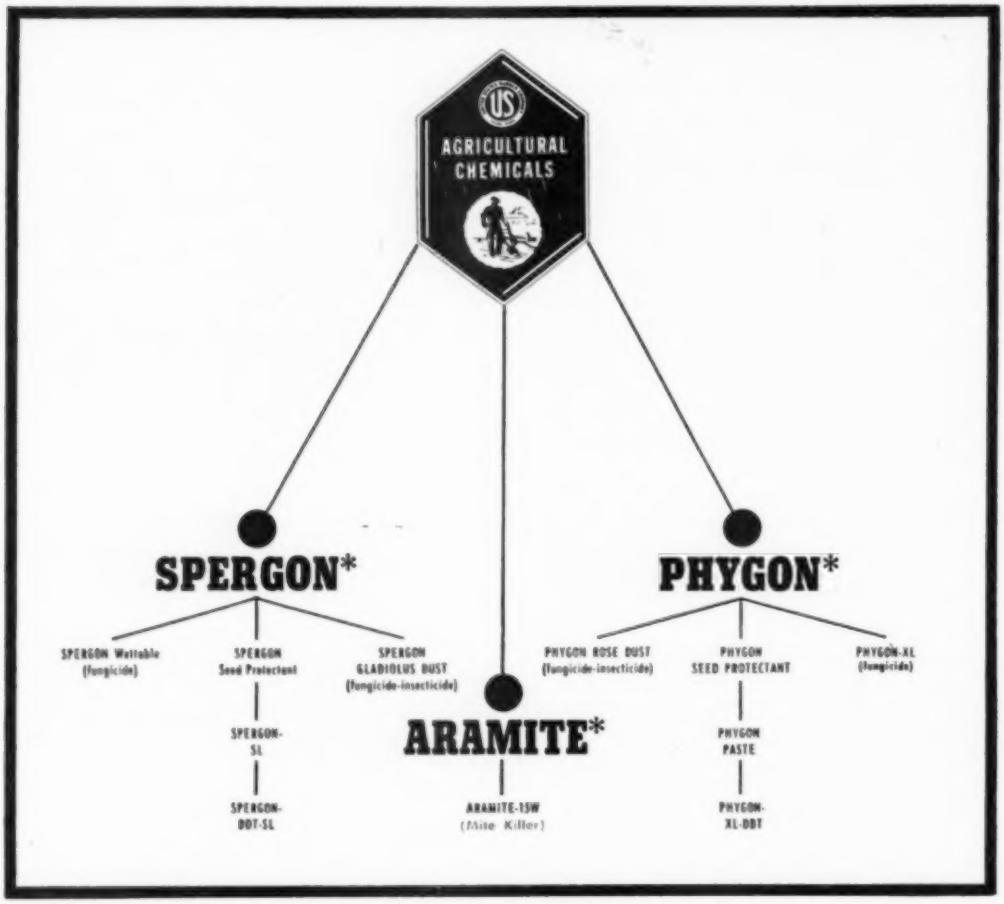
DUVAL POTASH *FOR BETTER PRODUCTS OF FARM AND FACTORY*



The Naugatuck Family Tree Bears Fruit For All

With due modesty, but not without pride, do we of Naugatuck speak of the many benefits made possible by our agricultural chemical products.

To farmers, growers and canners, they have helped to bring better crops, finer produce. To our suppliers and distributors... to the seed processors and all others our products serve, they have contributed a new source of business and profit.

Needless to say, this is a great source of satisfaction to us — and an incentive to discover and manufacture even finer products for the future.

*Reg. U. S. Pat. Off.

UNITED STATES RUBBER COMPANY

NAUGATUCK CHEMICAL DIVISION **NAUGATUCK, CONN.**

Also manufacturers of *insecticides*—Synklor-48-E, Synklor-50-W

Effective at extremely low dosages, ALDRIN and DIELDRIN are preeminent in the protection of food, feed and fibre crops from insect enemies both above ground and in the soil. These include *grasshoppers, cotton insects, soil pests, plum curculio* and many others.

Write today for complete information about formulating and applying ALDRIN and DIELDRIN.

Julius HYMAN & Company

DENVER, COLORADO

Manufacturers of ALDRIN and DIELDRIN

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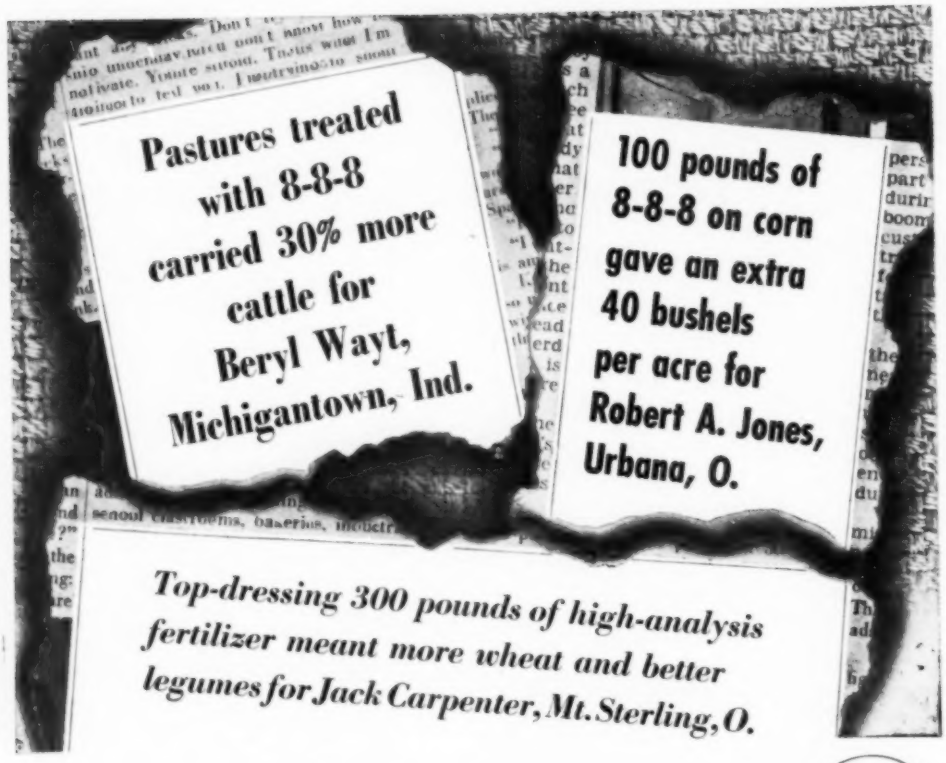


Bigger yields for farmers ... better business for you

USS AMMONIUM SULPHATE UNITED STATES STEEL

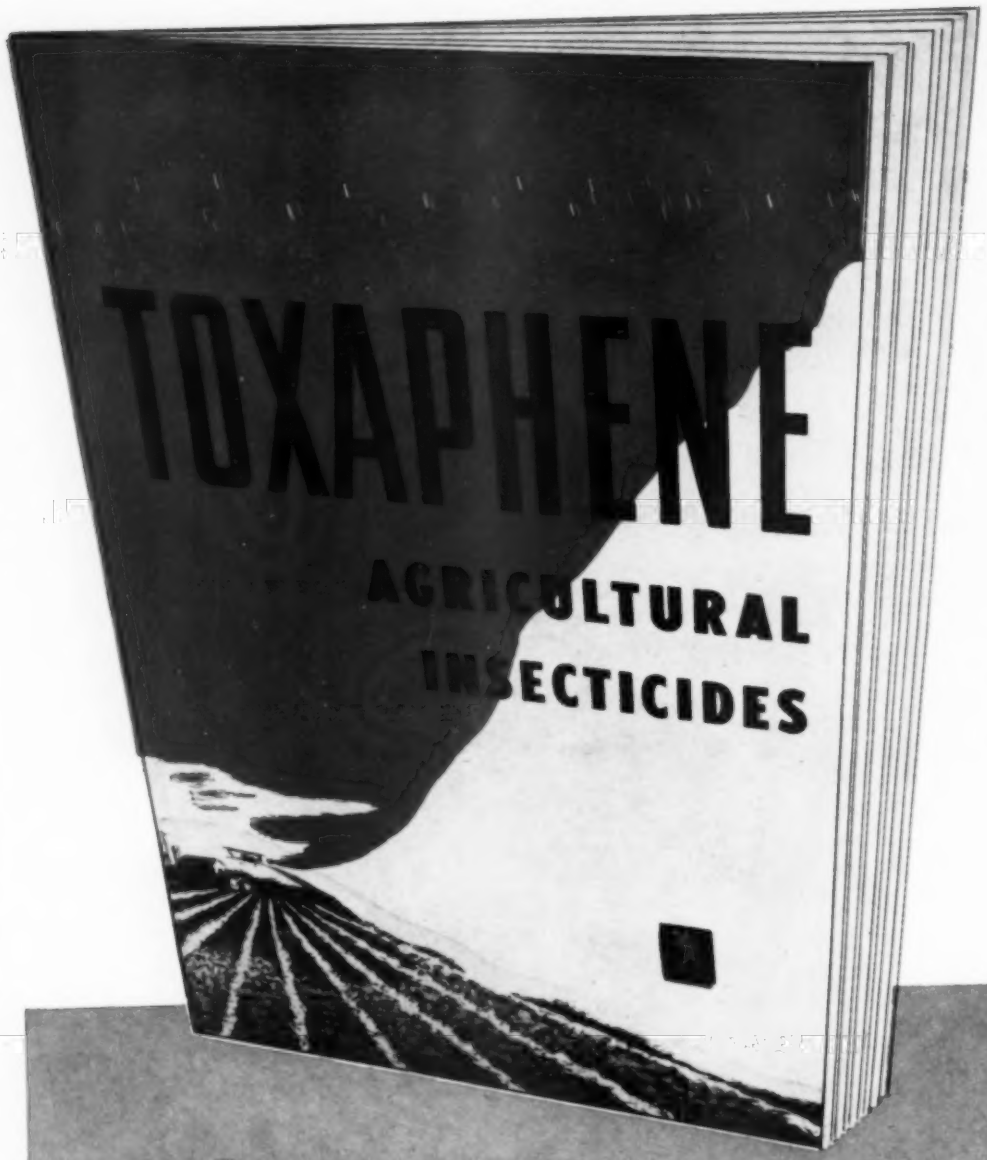
● The increased yields and increased profits that farmers are obtaining through use of high-analysis fertilizers containing U·S·S Ammonium Sulphate is big news these days.

As more and more farmers cash in on the use of adequate nitrogen, you'll find demand for these complete fertilizers rising steadily. Be sure your line includes them and be sure U·S·S Ammonium Sulphate supplies the bulk of the nitrogen units.

Heavy demand is taxing supplies of U·S·S Ammonium Sulphate, so anticipate your needs well in advance. For complete information, write to United States Steel Company, 525 William Penn Place, Pittsburgh 30, Pa.

USS **U·S·S AMMONIUM SULPHATE**

UNITED STATES STEEL



This new, 24-page book summarizes the latest information on toxaphene insecticides, including their use against cotton insects, livestock pests, alfalfa insects, cutworms and armyworms, grasshoppers, peanut insects, and many others. The book also contains valuable information on residues. If you have not received your copy, or require additional copies, write to:

HERCULES POWDER COMPANY
INCORPORATED
Naval Stores Dept., 970 Market Street, Wilmington, Del.

MAKERS OF TECHNICAL TOXAPHENE FOR AGRICULTURAL INSECTICIDES

NXS1-10

THE EDITOR COMMENTS

ANNOUNCEMENT by Carbide & Carbon Chemical Co. that it will build a six million dollar plant for the manufacture of allethrin should be good news to many in the insecticide manufacturing industry who have heretofore had to depend on a pyrethrum source half-way around the world. The new setup for making the synthetic product promises to end the uncertainty of supply and fluctuating prices which for years have forced American insecticide manufacturers to plan their operations for next season on a rather shaky basis.

With a capacity of 500,000 pounds per year, (considerably more than the present annual U.S. pyrethrum consumption) the new allethrin plant should remove from the manufacturer's calculations, the element of gamble on supply and price. Company officials state that the allethrin produced at the new unit will cost less than natural pyrethrins.

With the knowledge that a plentiful supply of allethrin is available, it is probable that research on the product will be stepped up greatly. Its toxicity has already been fairly well established at roughly the same low level as natural pyrethrins . . . an important consideration at a time when the public is super-conscious of toxic residues on foods.

Wisely, marketing of the new allethrin will be handled through established trade channels, giving the break to insecticide houses who know the ropes and who have contacts throughout the country. It is hardly expected that allethrin will replace the use of pyrethrum right away, but it is comforting for the trade to know that ample supplies are available from the United States and that we will no longer have to worry about bad weather or foreign squabbles affecting shipments of flowers to the U. S. It will be the first time that the American insecticide trade has ever been completely free from dependence on a foreign source of supply. We think that the industry will be better off because of this emancipation!

LATEST notices of judgment for violation of the Federal Insecticide, Fungicide and Rodenticide Act, published by the U. S. Department of Agriculture, reveal that out of a total of fifty-one cases, 49 included among other things failure to register products with USDA as required under the law. Where misbranding or wrong labeling are involved, there is the possibility of honest error or other extenuating circumstances. But, it is difficult to see where failure to register three or four years after the law went into effect could be much other than deliberate. With all the fanfare and publicity in the trade press, newspapers, and in association bulletins which accompanied passage of the law in 1947, how could anybody who can read miss the news?

Remembering that these fifty-one cases were filed by USDA from one to two years ago, the possibility exists that by now the registration situation may have shown improvement. However, we have a hunch that firms who continue to market their products across state lines and ignore the law because of ignorance or intent are fairly numerous still. A continuation of warnings, and reports of judgments, eventually may reduce the size of this group, although some of them, we imagine, will require the jolt of a citation to bring them up to date. The trade papers, trade associations, and the USDA have worked manfully to educate those unfamiliar with the law. By now, failure to register cannot receive too much sympathetic consideration.

THE fertilizer industry is looking forward to October 11, the date set aside by the National Safety Council for emphasis on reducing accidents in fertilizer plants. That such a program can be promoted with profit to both the manufacturer and his employees, has been demonstrated in actual practice. We hope you can come to the Chicago meeting!

Guest Editorial Written Especially for this issue of Agricultural Chemicals

Shackling Research Through Legislation

by

Lea S. Hitchner

National Agricultural Chemicals Ass'n.
Executive Secretary and Treasurer
Washington, D. C.

A POWERFUL group in the United States is slowly swaying the public attitude toward a fear of chemicals, including pesticides—to the end that research is in danger of being engulfed by a creeping paralysis, through excessive bureaucratic controls.

Paradoxically, the passive acceptance of this situation by scientists, through indifference or through lack of knowledge of its existence, condones the objectives of this group, and, at the same time, lends support to its proposals through lack of intelligent and constructive opposition.

The methods used in advocating excessive legislation conceal the actual extent of their proposals. Only a careful examination reveals that many sincere state and federal officials, societies and clubs, legislators and writers, and even scientists themselves are fostering and promoting regimentation of research through extreme controls as the only means of solving a problem of production and use.

The philosophy of increased and unnecessary legislative control can quickly enfeeble the freedom of research and stifle the creative thought and action that made this country the industrial giant it is today. It is no accident that Americans are favored with the highest standards of living in the world. Nor did this country progress from the primitive agrarian state of 150 years ago into the complex and highly industrialized nation of today without scientific research. Creative freedom built this nation and only creative freedom can keep our economy dynamic and progressive.

Research proved to be the hard core around which we built the machines to win World War II, just as it is the only wise and economical way to build our defense in an unsettled world. But if the present trend of trying to solve every problem by legislation continues, the well of creativeness will cave in.

The effects of shackling research will filter through all the processes of developing products for use by the consumer. Introduction of new products will be unduly retarded; the development of new uses will be delayed; improvements in existing materials will fail to continue; and the whole structure of a com-

plex industrial economy will begin to break down piecemeal for lack of general advancement in products and techniques that are so important in a highly integrated and complex society.

The consumer is always first to benefit from progress through research and the last to feel the effects of the curtailment of an activity so far removed from the actual product he knows. So the scientists, agriculturists and industrialists who know the value of research must inform the consumer of any action taken to destroy this basic and vital source of progress.

We need certain government controls to maintain our freedoms and to protect industry and the public. But there should be a definite limitation to government controls so that an area is left where formal regulations break off and business ethics begin to operate. It is this outer region which gives enough elbow room for individual thought and creativeness. And this is the area which is being compressed by the trend toward further unrealistic legislation!

The manufacture, distribution and sale of insecticides, fungicides, herbicides, defoliants and related products is a comparatively young business which arose from various segments of the chemical industry. Its growth through research and development of new products and better use of old ones has been phenomenal. The first stimulus toward establishment of pesticide production as a separate entity from the larger chemical industry began just after the turn of the century.

A few men with vision saw the growing necessity for control of pests and set out to do something about it.

Those early pioneers instigated the first efforts to search out products for the control of pests and adapt them to practical use at a time when a research worker was pictured as a bespectacled gray-beard puttering in a dark corner stocked with odd-shaped glassware and rank with the foul odor of mysterious concoctions; when an entomologist was a catcher and preserver of butterflies.

Progress was slow in those early years, and the agriculturists were skeptical until actual demonstrations proved the merits of insect control. Those companies who first manufactured pest control materials did so at a loss but they never lost sight of the potentialities of agricultural chemicals in increasing agricultural production and continued and expanded their efforts. During this early period, the acceptance and promotion of pest contol by the U. S. Department of Agriculture and Land Grant Colleges made a full team which has been pulling together to this date.

Out of this early research grew the agricultural chemicals industry as it is today—an industry manufacturing products without the use of which over one-half of the commonly-used foods in the U. S. could not be produced. Agricultural chemicals have contributed materially to the increase in agricultural production in the past ten years and their use has helped bring about this increase on the same acreage of land previously cultivated. In fifty years the industry has grown from an original output of a few thousand pounds to over a *billion* pounds of pest control materials produced during the current season.

With few exceptions, the new pest control chemicals introduced during the past ten years, were products of industrial research. Industry has the facilities to make these basic discoveries, and it is the responsibility of industry to do so. The U. S. Department of Agriculture and the Land Grant Colleges with their experiment stations throughout the U. S. have contributed immeasurably to the development of pesticides for practical use. The cooperation and mutual respect which has grown out of the association of industry and agriculture is not a casual relationship, but two links in the chain of research and development.

The mere statement that research will be curtailed does not prove the existence of the situation; but analysis of events covering a particular phase of production, will show that there are many manifestations of such a condition. Current attacks on the Agricultural Chemicals Industry are a prime example of what can happen.

It is the complex structure of this progress in agricultural chemicals which is being undermined by current magazine articles, press stories and political philosophy being propounded. The public is informed by implication or otherwise that there are practically no laws to protect them from residues which may or may not appear in foods; that much of the food they eat is poisoned by "chemicals"—a term which has been so misrepresented that the word has become synonymous with "poison." The public is made to believe, falsely, that pesticides are being thrown on on the market indiscriminately without any data whatsoever regarding their hazard to public health. This vicious and unjust attack is being made to frighten the American public into supporting legislation, recently introduced into Congress, which would give a few government officials the authority to review virtually all the research done on agricultural chemicals in the U. S. and interpret that data as they see fit, whether or not it agrees with the research worker's interpretation! The proposed legislation would permit these officials to be the sole arbiters as to whether a new product should be marketed. The proposals would also require toxicological, biological and other information of such magnitude that the time and money involved would prohibit the introduction of a new pesticide.

(*Turn to page 97*)

Representatives of Government and industry appear on program, 18th annual fall convention of

Nat'l Agricultural Chemicals Ass'n

PLANS for the 18th annual meeting of the National Agricultural Chemicals Association meeting were complete as this issue went to press. The convention was scheduled for September 5-7, at the Essex and Sussex Hotel, Spring Lake, N. J. Registration was to open the day after Labor Day (Tuesday, September 4) continuing through morning sessions of each of the following three days.

Lea S. Hitchner, executive secretary and treasurer of the Association, stated that the first day of the formal meeting, (Sept. 5) was to feature addresses of government officials to give the convention first-hand information about the relations of defense production and pesticides. Association president Ernest Hart, president of the Niagara Chemical Division of Food Machinery Corp., Middleport, N. Y., was to deliver his annual address on the opening day and Mr. Hitchner was to present his year's report to the group.

Government representatives scheduled to appear on the morning program of Sept. 5 include the following:

P. H. Groggins, Chief, Agricultural Chemicals Section, Chemical Division, National Production Authority, U. S. Department of Commerce.

Thomas H. McCormack, Chief, Rubber, Chemicals & Drugs Division, Office Price Stabilization, Economic Stabilization Agency.

Howard J. Grady, Chief, Agricultural Chemicals Section, Rubber, Chemicals & Drug Division, Office Price Stabilization, Economic Stabilization Agency.

L. B. Taylor, Director, Office of Materials & Facilities, Production & Marketing Administration, USDA.

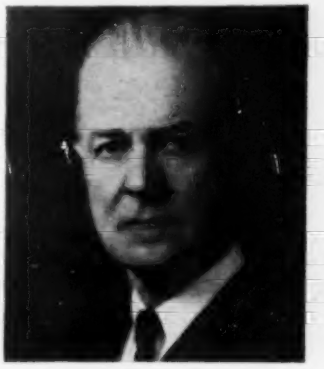
PHIL H. GROGGINS
To Discuss Chemical Supplies

H. E. LONGNECKER
Pittsburgh U. Dean on Friday Program

A. W. MOHR
Presides at business session

T. H. McCORMACK
Talks on supply picture

JACK VERNON
Appears on Friday's program



FIRMAN E. BEAR
Noted Agronomist speaks

William R. Allstetter, Deputy Director, Materials and Facilities Division, Production & Marketing Administration, USDA.

Wednesday night features a reception for NACA members, their wives and guests, at the Essex and Sussex.

Although no formal open session was scheduled for September 6, the day was to be devoted to Association business activities, committee meetings and election of officers. The annual NACA banquet was the feature of Thursday evening, with J. Albert Woods, president of Commercial Solvents Corp., New York, as speaker.

Friday's Program

FRIDAY'S program was planned to bring conventioneers up to date on problems relating to the presence of pesticide residues in food and matters covering supplies and manufacturing. Speakers scheduled to appear at the final session Friday included:

Dr. H. L. Haller, Ass't. Chief, Bureau of Entomology & Plant Quarantine, USDA.

Dr. H. E. Longenecker, Dean of the Graduate School of Research in the Natural Sciences, University of Pittsburgh and Chairman of the Food Protection Committee, National Research Council.

Dr. Firman E. Bear, Chairman, Soils Department, Rutgers University, New Brunswick, N. J.

Gus M. Ochm, Director of Public Relations, Pineapple Research Institute of Hawaii, Honolulu.

Jack Vernon, vice-president, Niagara Chemicals Division, Food Machinery & Chemical Corporation, Middleport, N. Y.

The program committee is composed of John Rodda, U.S. Industrial Chemicals, Inc., New York; Carlos Kampmeier, Rohm & Haas Co., Philadelphia; P. J. McManus, G L F Soil-Building Service, Ithaca, N. Y.; Dr. Alfred Weed, vice-president, John Powell & Co., New York, and Mr. Hitchner, ex-officio. The Sports Committee was also headed by John Rodda.

1951 fall meeting of particular importance to entire industry ... representatives of Government and Industry appear on NACA program . . . discussions of toxicology, residues, supplies, regulations all on agenda for Spring Lake Meeting.

Despite Unsettled Supply Situation, Korean War, "Scare" Articles in Magazines, Agricultural Needs Met by

Pesticide Industry

IN producing and effectively distributing more than a billion pounds of pesticides in the season just closed, the Agricultural Chemicals Industry has successfully met the challenge forced upon it by the Korean War and the still present threat of global conflict.

This challenge of 1951 had many parts, beginning with our responsibilities as an industry and as a trade association to the national effort to resist aggression. Agricultural chemicals are of course weapons in this day of total warfare. Thus it was natural that the U. S. Department of Agriculture set our industry production goals for 1951 higher than ever before.

The need for insecticides and other related chemicals was not restricted to agriculture, great and still growing as that need is. There was also the increasing need for the military services, for public health programs, and for export to friendly nations seeking to boost agricultural production and control insect-borne diseases of man. The total of these needs exceeded our 1950 production in practically all categories.

Further sharpening the challenge to our industry were shortages of the type which plagued us — but did not lick us — during World War II. Today we manufacture some of our products from a few basic chemicals which are also vital to other defense production needs — benzol and chlorine, for example. These and certain other basic chemicals were in short supply. Also in short supply were containers, labor and other production elements, all of which adds up to a challenge to produce more with less. But this is not the whole story.

We found it necessary to divert much time and energy to the hearings of the Food and Drug Administration, and of the Delaney Committee, on problems related to our industry. It was important that the industry cooperate in these hearings and full cooperation was willingly provided. But the hearings added nothing to industry production totals in this year of unprecedented need for pesticides.

All this, in brief, has been the challenge of 1951. As the challenge took definite form months ago the reaction to it within the industry was mixed. My own reaction was one of optimism; I felt that industry would measure up to its responsibilities if raw materials were made available.

On this point, and at our spring meeeting in Florida, I said:

> "I am sure that no farmer will find it necessary to forego chemical protection of his crops or livestock in 1951, although he may not in all instances be able to obtain precisely the material desired. Yet we may be sure that satisfactory alternate materials will be available for whatever products may be in short supply."

Perhaps some of you felt I was too optimistic in making that prediction at our Florida meeting. Events since, the performance of industry on production and distribution fronts, seem to have made me a good prophet. Let's look at the record.

I am not at liberty to state industry's exact production figures for 1951. But I have already stated that the total exceeds one billion pounds of pesticides, and that we have topped goals set in most categories by the U. S. Department of Agriculture. Among the goals exceeded by substantial percentages were those set for DDT, BHC, lead arsenate, calcium arsenate and several other major items.

Considering DDT in more detail, and quoting *Chemical and Engineering News* as my source, it is reported that the National Production Authority is contemplating a production of 105 million pounds for the year beginning October 1, 1951 — a goal which represents an increase of more than 10 million pounds over the present production level.

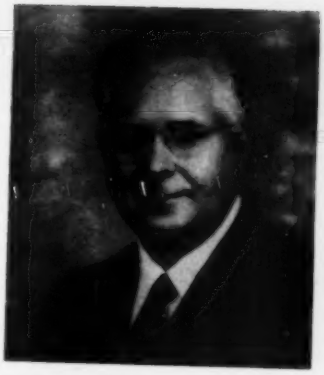
Of the 105 million pounds of DDT contemplated for the next year, NPA has estimated that 85 million pounds will go to agriculture, 5 million pounds for defense, and 15 million pounds for export to friendly countries. Much of the D-

by

Ernest Hart

President, National Agricultural Chemicals Association

From Addresses presented before NAC Association Spring Lake, N. J. September 5, 1951



DT shipped abroad will be used for fighting disease.

The high level of DDT production achieved by industry during the past year leads me to believe that there is now ample capacity to meet this new high goal. I believe, moreover, that the same can be said with respect to industry's manufacturing capacity for all other major products.

To repeat what I have said many times in the past to interested Government agencies and officials, I am confident that our industry can meet any reasonable production goals established for it. The year just closed is but another example of the soundness of that position.

Plenty for Farmers

AGAINST such a background of impressive production figures, it is my belief that during 1951 no farmer in this country found it necessary to forego chemical protection of his crops or livestock. Satisfactory protective material of some kind was available for all farmers in all parts of the country. We have watched this situation carefully and continuously. The few complaints to our companies and to the NAC office were principally from disgruntled dealers. I believe that every such complaint has been handled satisfactorily.

All of us can be proud of the fact that we have met the farmers' needs for chemical protection in 1951. That is our first responsibility. Without the food and fiber from the farms, our entire economy, including the defense and health program, would collapse.

One of our most important defense contributions has been our exports to friendly countries. I am sure you understand that after taking care of our armed forces, our domestic public health agencies, the Department of Agriculture, and last but not least, the American farmer, there was a great obligation to provide pesticides for the nations joined with us in resisting aggression. In such countries, our materials were needed mostly for public health purposes. Unfortunately, detailed figures are not available at this time, but I am privileged to quote from an official of the Department of Commerce, as follows:

> "Exports of insecticides for 1951, as compared with 1950, if they continue at the present rate, will exceed 1950 by at least 25 per cent, and in the first six months of 1951 exports and export license permits for the new types of chemical insecticides have exceeded in total all such exports for the whole year of 1950."

These data clearly indicate that the industry is meeting its responsibilities to friendly countries. We can take satisfaction in the fact that typhus, malaria, and various other diseases carried by insects have been definitely mitigated in many countries by the use of our industry's materials.

Returning now to the domestic scene, the current year has provided another demonstration of the effectiveness of our distribution system. Again we have proved that in any kind of economic weather our tried and established distribution system always works. I hope you have studied the maps of our distribution system which have been brought up-to-date. The maps show that today, as compared with eight or ten years ago, our number of producing plants, formulating plants and available warehouses has more than doubled, and that the geographical distribution of these facilities now covers practically all of the agricultural areas of the country. Our industry's preparedness and skill in distribution has been one of the major elements in our successful service to agriculture.

To sum up our defense activities, I can say without reservation that our participation in the defense effort has been effective and successful.

FDA Hearings

NEXT in importance in the year's activity were the Food and Drug hearings. These were completed during the early part of the year. We are now awaiting findings of fact, and probably tolerances, which I regret to say are not to be released for several months. Our Association, its individual members, the State Experiment Stations, the U.S.D.A., and a number of agricultural organizations joined hands in building a magnificent record. The cooperation of all interested parties in respect to the handling of these hearings was, in my opinion, one of the most outstanding examples of unselfish democracy working at its best. These hearings were expensive in time and money, but I think that they were worth all that they cost.

But as we moved from the Food and Drug hearings to those of the Delaney Committee of the House of Representatives we exper-

* Distributed by NAC Association.

ienced treatment which seemed to be based on a pre-determined position and a reluctance to welcome full testimony from our industry.

Prejudiced Hearings

THE blasts in the public press of recent weeks and the type of publicity given to the witnesses appearing before this committee have, I believe, at last brought our members and the chemical industry in general to a realization of how serious are the implications of this committee's recommendations. These can be harmful in their effects upon the future of our industry, the future of research in our industry, and in the placing of restrictions upon our growth which will be a distinct limitation for our service to agriculture.

Our Association has evolved a definite policy with respect to these hearings. That policy is to cooperate in any reasonable manner with the Delaney committee in so far as our cooperation is desired. Apparently this is not now the case. We are answering in various ways the accusations or implications being made against our industry by Mr. Delaney himself, and I believe that our thoughts in this respect are best indicated by the editorial on this subject which appears in the June-July issue of NAC *News*. Copies of that issue have been mailed to all Congressmen and Senators, and those interested in the continuance of healthy agriculture.

We do not oppose the Delaney hearings as such. We merely insist that credence be given to the existing controls which are currently guarding the public against the misuse of pesticides. Any proposals being considered to augment present controls, or to change jurisdictional authority over pesticides, should, we believe, be free of influence or idle conjecture, and unfounded public fear. If such proposals are required, then they must be conceived in the atmosphere of impartial investigation and unmarred by prejudices. In brief, they should be founded on realism and sober judgment. As an Association and as an industry we stand ready to support such a program in the public interest.

NAC Association Grows

SINCE I spoke to you a year ago, our Association has made great forward strides in member interest, in influence, and in importance to the economy. Our membership a year ago was 103. Today it is 124, an increase of 21, or roughly 20 per cent during the past year. This fine record of growth attests to the increasing value of the Association to industry.

Among the internal groups doing outstanding work, is the Traffic Committee which, through the past year, has continued its valuable contributions to the Association as measured by reduced rates and substantial savings in traffic costs. A study of the last Traffic Committee report will reveal that savings in traffic costs exceed the amount of Association dues. You will remember that last year Mr. McClintic retired as chairman of the Traffic Committee after having made a major contribution to the Association effort. I want to report that he still attends the meetings, still does most of the work, and is in attendance at this meeting.

"Not a Candidate"

IN line with my earlier recommendations that there be an annual turnover of certain members of the Board of Directors, I believe that the Association should adopt at least an unwritten policy to the effect that no president should be asked or permitted to serve more than two years. Acting personally on this belief I have notified the Board of Directors that I am not a candidate for re-election. But let me say that it has been an honor and a most pleasant experience to be your president for the past two years. It is true that the presidency, as I believe it should function, requires time and energy, and whoever undertakes the office in the future should be prepared to spend time and energy in the interest of the industry. Upon accepting the presidency two years ago, I promised to give the Association a business administration. In carrying out that pledge, I have had the highest order of cooperation from everybody—the Board of Directors, the staff, and members, in all areas where progress has been made. You have willingly placed money, people and cooperation at our disposal and this, of course, has been the keystone of progress. I believe the Association is in sound condition in respect to its finances, to its other business elements, and to its position not only in the agricultural economy but as reflecting properly the industry which it represents. I urge that you give your new president for 1952 the same whole-hearted support. I am stepping down, but not out, as I shall always have the interests of this group in my mind and in my heart, and shall continue to work for the mutual good.

Looking ahead to the year 1952, I believe the industry will be in a position to meet any reasonable increase in production goals for defense purposes. I say this because industry's facilities for both production and distribution have been further enlarged during the current year. If necessary raw materials are made available to us, we can do the production job.

For 1952, and for some years to come, I envision further growth of the industry, and a continued enlargement of its services to agriculture aid to the public generally. We can look forward to a continued search for raw materials, and to an intensification of research — provided research is not stifled by unnecessary government controls.

Our opportunities for enlarged service will continue to widen, especially if we continue to work together and to cooperate with the Government agencies concerned with agricultural pest control.

Finally, as we meet our responsibilities in all of these areas, I can foresee a continuance of the satisfactory condition with respect to sales and profits which has existed during the past two years.★★

A O. A. C; Feed, Fertilizer and Economic Poisons

Control Officials Meet

FOUR groups of control officials operating in the agricultural chemical field are scheduled to hold meetings at the Shoreham Hotel, Washington. D. C., the first week of October. The organizations to meet are the Association of Official Agricultural Chemists; Association of Feed Control Officials; American Association of Fertilizer Control Officials; and the Association of Economic Poisons Control Officials.

The complete schedule of meetings for the week is summarized as follows:

A.O.A.C. meets all day Monday, Oct. 1, all of Tuesday, and from 9 a.m. to noon on Wednesday, Oct. 3.

Tuesday evening, 7 p.m., the States Relations Committee of the Feed Control Officials meets.

Wednesday, Oct. 3, Feed Control Officials registration starts at 9 a.m. and at 1 p.m. a general meeting will be held.

Thursday. Oct. 4, all day general meeting of Feed Control Officials. At 7 p.m., the Fertilizer States Relations Committee meets, and at 8 p.m., the Fertilizer Executive Committee will have a session.

Friday, Oct. 8, an all-day session of the Fertilizer Officials will be held; and at 7:30 that night the States Relations Committee of the Economic Poisons Control Officials will meet.

Saturday, Oct. 6, all day session of the Economic Poisons Control Officials.

Fertilizer Officials

FOLLOWING registration, the roll call by states, the report of Secretary-Treasurer and announcements and appointment of committees, the Fertilizer Officials will hear the annual address of president R. C. Berry, Director, Division of Chemistry, Dept. of Agriculture, Richmond, Virginia. Mr. Berry will be followed by Paul T. Truitt, president, American Plant Food Council, Inc., Washington, D. C.; and Dr. Russell Coleman, president, National Fertilizer Assoc., Washington, D. C.

The Industries Research Program will be described by Dr. H. B. Siems, chairman, National Fertilizer Association, Research Committee, Chicago, Illinois; "Minor Elements" will be described by Dr. Firman E. Bear, chairman, Soils Dept. Rutgers University, New Brunswick, New Jersey; and F. H. Leavitt, Fertilizer Department, Shell Chemical Corp., San Francisco, California, will speak on "Fertilization Through Irrigation."

A discussion period is planned to complete the morning session.

The afternoon session will feature a paper, "Acid Insoluble Ash and Carbonates in Mixed Fertilizers," by K. G. Clark, V. L. Gaddy, A. E. Blair and F. D. Lundstrom, U. S. D. A., Beltsville, Maryland; preceding a report of investigators and Report of Committees.

"How the Control Officials, the Fertilizer Industry and Agricultural Workers can Coordinate their Activities to have a Sounder and more Progressive Agricultural Program" will be discussed by Dr. J. F. Fudge, State Chemist, College Station, Texas.

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Economic Poisons Group

THE final day of the meeing, October 6. will be devoted to the Association of Economic Poisons Control Officials, according to Dr. A. B. Heagy, University of Maryland, secretary-treasurer of the organization. Beginning with registration at 9 a.m., the program will comprise the report of the secretary-treasurer and roll call by states preceding the annual address of the A.E.P.C.O. president, Allen B. Lemmon, director of the California State Bureau of Chemistry, Sacramento.

The remainder of the morning program will include a talk on new miticides by C. O. Persing, Stauffer Chemical Co., New York; a discussion on legislation by John D. Conner, Washington attorney and counsel for the National Agricultural Chemicals Association; a paper on warfarin rodenticides by W. W. Dykstra, Assistant Chief, Predator and Rodent Control, U.S.D.A.; and a talk, "Soil Use of New Insecticides," by V. A. Tiedjens, director of the Virginia Truck Experiment Station.

Following lunch, the meeting will resume at 2 p.m., with a talk on systemics by Floyd F. Smith, entomologist, Bureau of Entomology and Plant Quarantine. U.S.D.A., a series of committee reports, and election of officers.

The current shortage of sulfur makes the fertilizer manufacturer wonder just how feasible H_2SO_4 substitutes are. Authors Clark and Hardesty describe their observations in plants in Norway and Netherlands.

Treatment of Phosphate Rock with NITRIC ACID*

IN May, 1950 the authors visited two plants producing phosphatic materials for fertilizer use by the treatment of phosphate rock with nitric acid—one operated by Staatsmijnen (Netherlands State Mines) at Geleen in Limburg, the Netherlands, and the other by Norsk Hydro-Elektrisk Kvaelstofoktieselskab at Heroya, Norway.

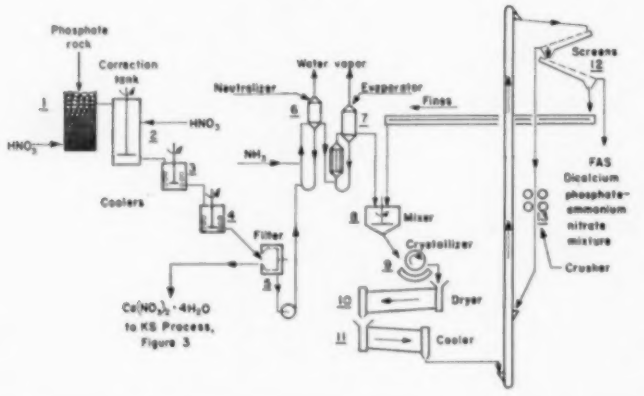
Neither plant produces a nitric acid superphosphate, reaction 1, because of the poor physical condition imparted to the product by its content of highly hygroscopic calcium nitrate hydrate. The processes employed by State Mines and Norsk Hydro are similar in that phosphate rock is dissolved in nitric acid to produce a solution containing nitric acid in excess of the calcium nitrate equivalent of the rock. The solution is then cooled to cause crystallization of a calcium nitrate salt until the ratio of the calcium and phosphorus in solution decreases to approximately that of dicalcium phosphate. At this stage the calcium nitrate salt is removed by filtration. The filtrate which still contains nitric acid equivalent is neutralized with ammonia and concentrated by evaporation until on chilling, with or without the incorporation of solid potassium chloride or potassium sulfate, a magma is obtained which subsequently may be handled as a solid and dried in granular form.

$$Ca_{10}F_2(PO_4)_6 + 14\,HNO_3 + (7x+3)\,H_2O \longrightarrow 3\,Ca(H_2PO_4)_2{\cdot}H_2O + 7\,Ca(NO_3)_2{\cdot}xH_2O + 2\,HF \qquad (1)$$

comparable to the familiar sulfuric acid superphosphate, reaction 2,

$$Ca_{10}F_2(PO_4)_6 + 7\,H_2SO_4 + (7x+3)\,H_2O \longrightarrow 3\,Ca(H_2PO_4)_2{\cdot}H_2O + 7\,CaSO_4{\cdot}xH_2O + 2\,HF \qquad (2)$$

Figure 1



State Mines produces Fosfaatammonsalpeter (FAS), 20-20-0, by the direct chilling procedure and 15-10-20, 12-10-20, and 12-10-15 mixtures by incorporation of additional ammonium nitrate and potassium chloride into the slurry for the 15-10-20 grade and potassium sulfate for the others. Introduction of the sulfate necessarily results in the formation of some calcium sulfate and distribution of the equivalent potassium between the phosphate and nitrate groups. Production of FAS, 20-20-0, is reported as 80 metric tons daily, with expansion to 300 tons proposed. The calcium nitrate produced in this process is used either in the production of Kalksalpeter (KS, 15.5 percent N), substantially $5Ca(NO_3)_2{\cdot}NH_4NO_3{\cdot}10H_2O$, or 91 percent anhydrous calcium nitrate.

*Contribution from the Bureau of Plant Industry, Soils, and Agricultural Engineering, A.R.A., U.S.D.A., Beltsville, Md. Presented in part before the Division of Fertilizer Chemistry at the 118th Meeting of the American Chemical Society, Chicago, Ill

By

K. G. Clark

and

John O. Hardesty†

As shown by the following tabulation FAS, 20-20-0, may be considered as Kalkammonsalpeter (KAS) or Cal-Nitro, 20.5 percent N, in which calcium carbonate has been replaced with dicalcium phosphate.

	Cal-Nitro or KAS	*FAS, 20-20-0*
Ammonium nitrate	60	60
Calcium carbonate	40	—
Dicalcium phosphate	—	40

Norsk Hydro does not produce the 20-20-0 grade but instead utilizes the dicalcium phosphate-ammonium nitrate solution to prepare a 13.5-13.5-19 mixture by incorporation of potassium chloride and an 11.5-11.5-21 grade using potassium sulfate. Current productive capacity for mixtures of this type is 40,000 metric tons annually, with expansion planned to four or five times this quantity.

Netherlands State Mines Process

THE flow diagram of the process in use by the State-Mines for the treatment of phosphate rock with nitric acid for the production of FAS, 20-20-0, and co-product calcium nitrate is shown in figure 1. The several steps of the process insofar as they are based on phase relations in the $CaO-N_2O_5-P_2O_5-H_2O$ system are represented in the Jänecke-type diagram, figure 2, as described by Plusjé (7) for the so-called reciprocal salt pair,

$$(HNO_3)_6 + Ca_3(PO_4)_2 = [Ca(NO_3)_2]_3 + (H_3PO_4)_2 \qquad (3)$$

The stainless steel tower *1*, figure 1, is kept filled with unground, lump phosphate rock. Nitric acid, 53 percent, at 60°C. enters the base of the tower. During the upward passage of the acid the rock is dissolved to produce a solution, the composition of which is largely independent of the amount of nitric acid added, but which is nearly saturated with monocalcium phosphate. The heat of solution increases the temperature to about 85°C. This corresponds to the path EF in the salt-pair diagram, figure 2. At the point F, cooling the solution, or removal of water by evaporation would result in precipitation of monocalcium phosphate, and the composition of the solution would move to the left along the projection of a line (not shown) through KF. To avoid deposition of monocalcium phosphate, nitric acid is added to the solution in tank 2 until point G is reached At this point the relative proportions of CaO, N_2O_5, and P_2O_5 in the solution are such that, on cooling, calcium nitrate tetrahydrate, $Ca(NO_3)_2 \cdot 4H_2O$, will separate out as the solid phase (6) while the composition of the solution moves along the path GH, an extension of the line CG (not shown). The necessary cooling is accomplished in two stages to approximately 10°C. in vessels 3 and 4. Water is used in the first stage to reduce the solution temperature to 35°C., and calcium nitrate brine in the second stage. The brine itself is cooled in a supplementary heat exchanger (not shown) by vaporization of liquid ammonia, which subsequently is used in gaseous form for neutralization purposes. The calcium nitrate tetrahydrate crystals are separated from the residual solution in centrifugal filter, *5*. The filtrate which has the relative composition indicated by point H is neutralized in two or more stages by introduction of gaseous ammonia, 6, and concentrated by evaporation, 6 and 7, to yield a hot slurry of dicalcium phosphate and ammonium nitrate.

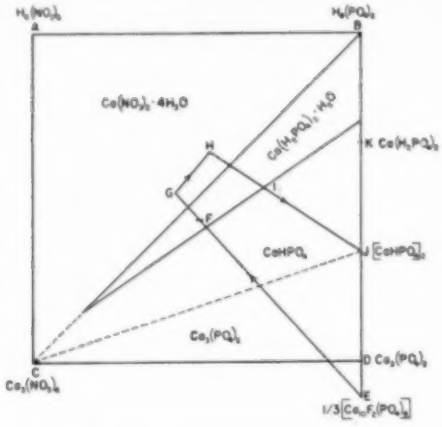
The line AHJ represents nitric acid-dicalcium phosphate solutions. Path HIJ represents the removal of nitric acid from the four-component system without change in the ratio of the CaO and P_2O_5 components. Path HI applies to solutions which are unsaturated with respect to calcium nitrate or phosphate salts during this removal, while path IJ applies whether or not solid phase dicalcium phosphate forms as the removal is continued. Since water other than water of constitution is not represented in the four-component diagram, point J represents solutions and slurries of dicalcium phosphate as well as the dry salt itself.

Neutralization of the filtrate H with ammonia, although introducing a fifth component into the system may be represented in the four-component diagram as the removal of the equivalent nitric acid. If this is done, the path HIJ becomes the resultant along which ammonium nitrate is being formed as neutralization of the nitric acid proceeds to completion at point J. Under these conditions the relative proportions of ammonium nitrate and dicalcium phosphate in the final product or in the slurry at point J, however, correspond to the $CaO-P_2O_5-NO_3$ ratio of the filtrate H. If the CaO to P_2O_5 ratio of the filtrate exceeds that required for dicalcium phosphate formation, the product may also contain some calcium nitrate and more basic phosphate, whereas if the P_2O_5 is in excess, the product will contain a part of the phosphate in monobasic form.

The slurry from the evaporator is thickened in mixing tank 8 by the addition of the fines from the classifying screen *12*, and by incorporation of potash salts if N-P-K mixtures are being produced. The thickened slurry is chilled and crystallized on flaking rolls 9. The flaked material is concurrently dried with hot air and converted into more rounded granules in the rotary dryer *10*. The hot granulated product is cooled in the rotary cooler *11* and

†Senior Chemist and Chemist, Division of Fertilizer and Agricultural Lime, respectively.

Figure 2



classified by screening over 4 mm. and 1 mm. opening sieves *12*, respectively. The over-size granules are crushed and returned to the screens in a closed circuit as indicated, and the fines are returned for thickening the slurry and for regranulation.

This process eliminates the need for grinding the rock as required in the production of superphosphate. Adequate process control is afforded by the temperature and composition (acidity) of the solution at all stages. It is estimated that approximately 70 to 75 percent of the total nitric acid is introduced in tower 1 and the balance in correction tank 2.

Disposition of Calcium Nitrate

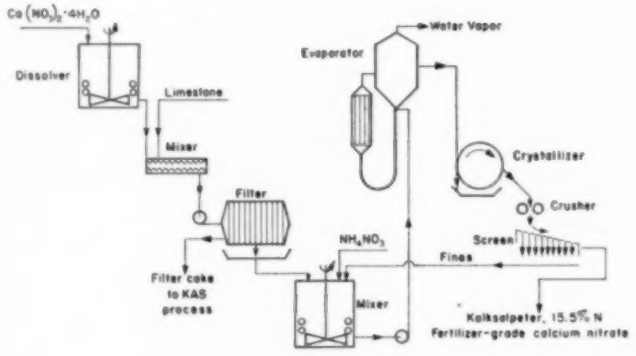
AT the State Mines plant, utilization of the calcium nitrate produced by the nitric acid treatment of phosphate rock is integrated with existing production of fertilizer-grade calcium nitrate (Kalksalpeter, KS), 15.5 percent N, and Cal-Nitro (Kalkammonsalpeter, KAS), 20.5 percent N, in accordance with the flow diagram shown in figures 3 and 4.

The calcium nitrate tetrahydrate is dissolved in water, figure 3, and treated with calcium carbonate or hydroxide (*10*) to convert any uncombined nitric acid and phosphoric acids to calcium salts. The slurry produced is filtered and the filter cake diverted to the production of KAS. Ammonium nitrate, or ammonia and nitric acid, is added to the filtrate and the solution evaporated for the production of the double salt, $5Ca(NO_3)_2 \cdot NH_4NO_3 \cdot 10H_2O$, which is chilled and crystallized on a flaking drum as indicated to produce fertilizer-grade calcium nitrate, KS.

The filter cake is treated with ammonium sulfate to convert any calcium nitrate present to calcium sulfate and ammonium nitrate, and incorporated with limestone in the Kalkammonsalpeter, KAS, process shown in figure 4.

Anhydrous calcium nitrate is reported to be more convenient for fertilizer use than the double salt $5Ca(NO_3)_2 \cdot NH_4NO_3 \cdot 10H_2O$. Although the former is the more hygroscopic, it does not readily cake and may absorb as much as 40 percent of water (equivalent to approximately 3.6 moles of water per mole of calcium nitrate) before becoming moist. When the anhydrous salt rather than KS is to be prepared, the filtration step following the treatment of the calcium nitrate solution with calcium carbonate may be omitted and the solution concentrated to about 78 percent calcium nitrate at 149°C. The melt is then thickened with previously produced anhydrous product to permit removal of the residual water in a rotary-drying, granulation operation. As indicated by de Bruijn and Plusjé (*1*), the anhydrous product admixed with the solution is several times the net production. Alternatively, the calcium nitrate solution may be heated under pressure to a higher temperature and advantage taken of the flash evaporation which accompanies a reduction in pressure either to decrease or to eliminate entirely (*4*) the need for recycling the anhydrous product. The product is approximately 91 percent anhydrous calcium nitrate (15.5 percent N) and contains calcium carbonate, precipitated phosphates and impuri-

Figure 3



ties derived from the phosphate rock.

Norsk Hydro Process

THE Norsk Hydro process differs from the State Mines process in several respects. The raw phosphate (apatite from the Kola Peninsula, U. S. S. R.) is received in a finely ground condition, and the rock and acid are proportioned into reaction vessels rather than being brought together in an extraction tower. A higher concentration of acid, for instance 65% HNO_3, containing some ammonium nitrate is used in dissolving the phosphate rock. Cooling of this rock-acid-ammonium nitrate solution results in the direct separation of the double salt, $5Ca(NO_3)_2 \cdot NH_4NO_3 \cdot 10H_2O$, with the CaO to P_2O_5 mole ratio of the residual solution approximating that of dicalcium phosphate (comparable to the separation of $CaO(NO_3)_2 \cdot 4H_2O$ along the path GH in figure 2). The double salt is separated from the mother liquor, washed with nitric acid, and utilized in the production of fertilizer-grade calcium nitrate, 15.5 percent N. The filtrate is neutralized with ammonia and concentrated by evaporation. The resultant dicalcium phosphate-ammonium nitrate slurry is thickened by the addition of potash salts and mixed in a pug mill until it becomes sufficiently friable to be introduced into a rotary for drying and granulation. After drying, the product is cooled and screened as in the State Mines process, and the fines are returned to the pug mill.

The use of 65 percent rather than 53 percent nitric acid in the decomposition of the rock represents a reduction of nearly 40 percent in the amount of water to be evaporated in the process. This is an important consideration where fuel and energy costs are high. At Norsk Hydro the necessary steam for evaporation is supplied by recompression of the water vapor produced. The air required for the rotary dryer is electrically heated.

Utilization of the double salt produced in the process is integrated with a daily production of approximately 2,000 metric tons of fertilizer-grade calcium nitrate, principally by the direct action of nitric acid on limestone.

Alternative Procedures

EXAMINATION of the salt-pair diagram, figure 2, indicates several ways other than those presently in use by the State Mines and Norsk Hydro in which nitric acid may be used for the production of fertilizer-grade phosphates from phosphate rock. None, however, avoid the necessity of producing calcium nitrate either in solution or in solid form equivalent to the calcium in the rock in excess of that associated with the desired phosphate products. Among the possibilities are cyclic processes for alternately recovering separately either mono- or dicalcium phosphate and calcium nitrate, and dissolving additional rock in the mother liquor. Such processes in effect accomplish decomposition of the rock in accordance with the following equations without the production of ammonium nitrate, but require substantial removal of the fluorine at (8) one stage in the cycle.

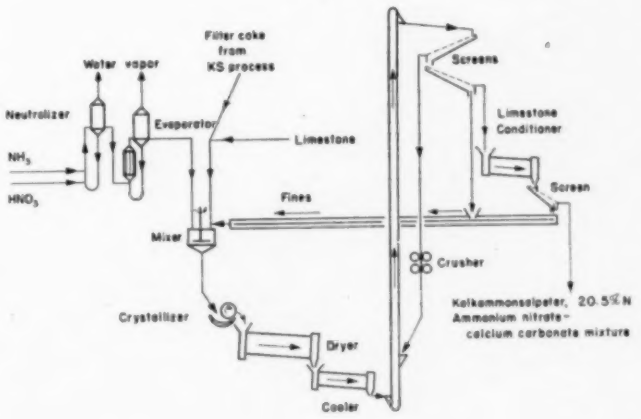
$$Ca_{10}F_2(PO_4)_6 + 14\ HNO_3 = 3Ca(H_2PO_4)_2 + 7\ Ca(NO_3)_2 + 2\ HF \quad (4)$$

$$Ca_{10}F_2(PO_4)_6 + 8\ HNO_3 = 6\ CaHPO_4 + 4\ Ca(NO_3)_2 + 2\ HF \quad (5)$$

An additional possibility involving the production of ammonium nitrate is the direct production of dicalcium phosphate by neutralization of the initial rock-acid solution with ammonia, with or without prior fluorine removal, rather than by acidulation for separation of calcium nitrate as presently conducted by the State Mines and Norsk Hydro. Dicalcium phosphate may be recovered by filtering the neutralized solution. In this case the mother liquor is a solution of ammonium and calcium nitrates requiring further treatment. The Tennessee Valley Authority (*11*) has investigated this possibility and reports that filtration difficulties encountered in recovering the dicalcium phosphate may be overcome in part at least by stepwise ammoniation and filtration. Presumably filtration difficulties also would have to be overcome in the cyclic processes mentioned earlier for separate production of mono- and dicalcium phosphate.

The problem of converting the calcium nitrate unavoidably produced when phosphate rock is treated with nitric acid to a more satisfactory nitrogenous fertilizer for domestic conditions than the fertilizer grades of calcium nitrate produced in the Netherlands and in Norway is an important deterrent to the adoption of processes for the nitric acid decomposition of phosphate rock in the United

Figure 4



States. The Tennessee Valley Authority (*11*) has investigated processes in which mixtures of nitric and phosphoric or sulfuric acids are used for decomposition of the rock, and the resulting acid solution is neutralized with ammonia, evaporated, and dried, either with or without the incorporation of potash salts in the slurry, to produce N-P or N-P-K mixtures in accordance with the following reactions.

$$Ca_{10}F_2(PO_4)_6 + 16\ HNO_3 + 4\ H_3PO_4 + 17\ NH_3 \longrightarrow 9\ CaHPO_4 + NH_4H_2PO_4 + 16\ NH_4NO_3 + CaF_2 \quad (6)$$

$$Ca_{10}F_2(PO_4)_6 + 12\ HNO_3 + 4\ H_2SO_4 + 13\ NH_3 \longrightarrow 5\ CaHPO_4 + NH_4H_2PO_4 + 4\ CaSO_4 + 12\ NH_4NO_3 + CaF_2 \quad (7)$$

The paths of these processes are represented in the salt-pair diagrams of figures 5 and 6, where paths EF and EF' represent the reaction between the rock and nitric acid and paths FG and F'G' the addition of the indicated proportions of phosphoric and sulfuric acid, respectively (the addition of the sulfuric acid being equivalent to the removal of CaO from the four-component system). The paths EG and EG' indicate the effective paths of the mixtures of acids. The paths GH and G'H' indicate the resultant paths followed as a result of neutralization and evaporation of the mixture. These processes effectively reduce the quantities of sulfuric and phosphoric acid normally required for the decomposition of phosphate rock by replacement of a portion of these acids with nitric acid. Thus unit quantities of sulfuric and phosphoric acids used in the processes described decompose 75 and 250 percent more phosphate rock, respectively, than if used alone for superphosphate production. The net effect, however, where sufficient nitric acid is used to effect decomposition of the rock is that the sulfuric and phosphoric acids are used to convert calcium nitrate to calcium sulfate and dicalcium phosphate in accordance with the reactions:

$$Ca(NO_3)_2 + H_2SO_4 + 2\ NH_3 \longrightarrow CaSO_4 + 2\ NH_4NO_3 \quad (8)$$

$$Ca(NO_3)_2 + H_3PO_4 + 2\ NH_3 \longrightarrow CaHPO_4 + 2\ NH_4NO_3 \quad (9)$$

In the case of the phosphoric acid process an excess of nitric acid is indicated so that all of the added phosphoric acid may be considered as reacting with calcium nitrate, whereas in the sulfuric acid process one-fourth of sulfuric acid is required in the decomposition of the rock and three-fourths for the reaction with calcium nitrate.

Among the attractive possibilities which would eliminate the use of sulfuric and phosphoric acids for reaction with the unavoidably produced calcium nitrate would appear to be (1) the treatment of phosphate rock-nitric acid solutions with ammonia and carbon dioxide as suggested by the State Mines (*3, 9*) and (*2*) the treatment of calcium nitrate or calcium nitrate and ammonium nitrate solutions with ammonia and carbon dioxide to produce a mixture of calcium carbonate and ammonium nitrate. According to the State Mines suggestion a rock-acid solution with a mole ratio of CaO to P_2O_5 in excess of 3.3

(*Turn to page 113*)

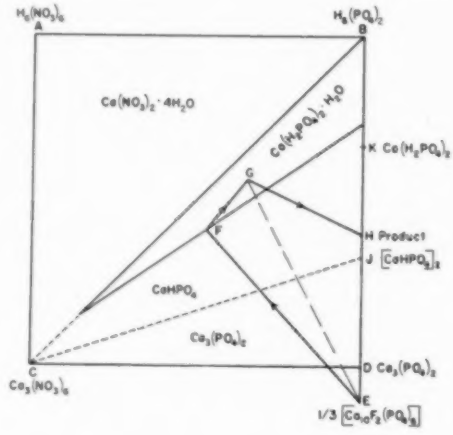


Figure 5

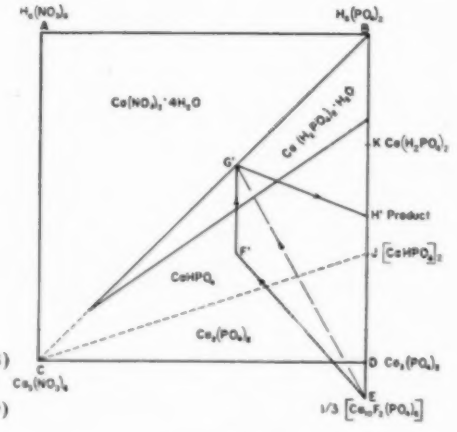


Figure 6

American Chemical Society hears numerous technical papers on

PESTICIDES & FERTILIZERS

NUMEROUS papers covering the agricultural chemical field were included on the agenda of the American Chemical Society's meeting in New York, beginning September 3. The convention, held in connection with the World Chemical Conclave, was headquartered at the Hotel Statler, New York, with sessions being held in other hotels in the vicinity as well as in the Statler. On September 13, the convention moved to Washington, D. C., for conclusion. Headquarters were the Hotel Statler, Washington.

Papers presented in the Pesticide Section were numerous and covered a broad scope of activity. New insecticidal and fungicidal compounds were introduced, new data on insect resistance to toxicants was presented and problems of weed control were discussed.

Summaries of some of the papers follow:

RECENT BRITISH DEVELOPMENTS IN THE TAINT-FREE USE OF BHC. Dr. E. Holmes, Technical Department, Plant Protection Ltd., London, England.

Since the discovery that BHC is a remarkable insecticide, its use in agriculture has been limited by its causing taint in some food crops. Isolation of substantially pure gamma-BHC has helped not only by lowering the taint potential at a given level of insecticidal performance, but by making possible new techniques of application. Gamma-BHC, however, is necessarily more expensive at present. Recent research has shown how careful application can enable even the inexpensive, normal mixture of isomers containing only 12 to 14 percent of gamma-BHC to be used in top-fruit spraying. Giving lower-cost control of a wider range of insects than the conventional program.

It was reported in England in 1947 that incorporation of technical gamma-BHC in the ordinary organo-mercury seed dressing could give excellent protection of cereals against attack by wireworms (*Agriotes* spp.) without diminution of the effect of the fungicide. It has since been found that the method fails occasionally, but only when wireworm populations are abnormally high. Under all ordinary conditions the combined seed dressing is the cheapest method of control yet proposed.

The newest development in BHC usage in Britain is the substitution of several spring applications of a 50% BHC dispersible powder in place of the conventional winter program using tar and petroleum oils or DNC. Whereas the older program gave excellent control of aphis, sucker and capsid, moderate control of caterpillars and red spider, and no control of apple blossom weevil, sawfly and wooly aphis; the BHC program is effective against all these except red spider. Because of this, the new program has been made possible by the advent of the phosphorus acaricides, particularly parathion. The last application of BHC (mixed isomers) is made not later than the petal-fall stage and under these conditions, no taint of top fruit has been experienced in three years' field work.

EXPERIMENTS WITH A NEW EFFECTIVE INSECTICIDE AGAINST RESISTANT MUSCA DOMESTICA. Robert Wiesman, J. R. Geigy, A.G., Basle, Switzerland.

The "1-phenyl-3-methyl-pyrazolyl-(5)-dimethyl-carbamate," synthesized by Dr. H. Gysin, Chemical Laboratories of J. R. Geigy A.G. (patent pending), referred to hereafter as "Pyrolan," is lipoid-and water-soluble and corresponds to Rotenone in its acute toxicity for warm blooded animals. Sucking insects however, may be killed by very small doses. Musca domestica, several Aphides, and Microlepidopters moths are particularly sensible. The quick toxic action is astonishing. In high concentrations, "Pyrolan" possesses, as a contact insecticide, a wide spectrum of action. At doses below 0.1 mg/100 ml only a few animals have been attacked: among them Musca domestica and its larvae, which are highly resistant to DDT. Water insects, especially Trichoptera larvaes, are extraordinarily sensitive to "Pyrolan."

The insects contacted by "Pyrolan" show a strange clonic tremor as well as a strong inflation, caused by constant movements of the mouth. The point of action of the drug producing the tremor is located in the motoric part of the thoracal ganglia. By injection of barbituric acids a clear antagonistic effect of "Pyrolan" could be proved. "Pyrolan" has practically no influence on the insects' heart. The drug is eliminated in the blood and partially accumulated in some body organs. The respiration and elimination of CO_2 are strongly increased by the tremor and at the same time there appears an abnormally high output of water. The pH of blood and muscles is changed towards the acid direction.

"Pyrolan" causes a strong inhibition of cholinesterase. The new drug is effective not only against the normally sensitive Musca domestica but owing to its new mode of action, is also strongly toxic on species highly resistant to different contact insecticides. Experiments showed that "Pyrolan," applied direct, possesses a good k.o. action and, applied as a layer, an effect of remarkable duration against the resistant house fly. Experiments in territories with flies highly resistant to DDT, in Switzerland and Sardinia, proved that it is possible for several weeks to eliminate flies from the room treated with "Pyrolan" spray. There is no evidence until now that a resistance of any kind could be provoked in Musca domestica against "Pyrolan."

SOME BIOCHEMICAL FACTORS IN THE RESISTANCE OF HOUSEFLIES TO DDT. W. M. Hoskins, A. S. Perry, O. H. Fullmer and A. S. Tayhori, University of California, Berkeley, California.

The ability of certain houseflies to survive large doses of DDT is due chiefly to inheritable biochemical reactions in the resistant races. Absorbed DDT is changed into the relatively harmless ethylene derivatives, DDE, in all resistant races tested to date and the amount changed is proportional to the resistance as measured by the LD_{50} values.

The reaction appears to be controlled by an enzyme for it is totally inhibited when flies are killed by heat. It

is also inhibited by application of certain chemicals, e.g., piperonyl cyclonene, to the living flies, either in the DDT solution or separately. These chemicals increase the toxicity of DDT to resistant flies in proportion to their inhibition of the dehydro-halogenation. When used at the optimum ratio to DDT, piperonyl cyclonene removes 80-90% of the resistance, but no chemical tested to date has brought highly resistant flies completely to the susceptibility of the nonresistant race. The effect of these synergists is not due to change in rate of penetration, for the various races absorb DDT at almost identical rates and addition of piperonyl cyclonene slightly retards absorption.

Resistant flies surviving application of DDT, contain within their bodies relatively large amounts of unchanged DDT in addition to DDE. This DDT remains chiefly in the body segment where applied, but the DDE tends to accumulate in the cuticle. Absorbed DDT occurs in the blood and probably is distributed in the body by this route. More DDT disappears than can be accounted for from DDE formed, so another unidentified detoxification process plays a role in resistance.

The various races normally respire at the same rate, but the respiration of non-resistant flies increases to a sharp maximum several times the normal value within one to three hours after application of DDT and then steadily declines to zero after 24 hours or more. The respiration of resistant flies is increased only slightly by DDT alone but reaches about 80% of that of treated nonresistant flies if piperonyl cyclonene is applied also. Total respiration of each race when exposed to DDT is considerably less than that of flies allowed to starve to death, as measured by carbon dioxide produced. Hence death occurs from DDT before all metabolic reserves have been exhausted.

THE DIFFUSION OF ETHYLENE DIBROMIDE THROUGH SOIL, W. J. Hanson and R. W. Nex, Agricultural Laboratory, The Dow Chemical Company, Seal Beach, California.

An investigation was undertaken to study, by chemical and physical measurements, factors influencing diffusion of fumigants through soil, thus to learn how to obtain the greatest efficiency from the fumigant. Ethylene dibromide (1, 2-dibromoethane or EDB) was selected for this research because it can be readily analyzed in soil.

Liquid ethylene dibromide vaporizes in the soil to a gas which diffuses in all directions. Its rate of movement is largely regulated by soil porosity. In many soils, it is possible and desirable to slow down the movement of the diffusing fumigant by decreasing the soil porosity in order to increase the exposure period to the pests. Gaseous diffusion is very dependent on structure in clay soils.

Practical field applications of fumigants to high organic soils have generally been of erratic value, due to the tremendous adsorptive capacity of such soils. Experimental results show that the adsorption of ethylene dibromide on such soils may be materially reduced and good diffusion obtained by proper preparation of the field before fumigation.

A study of changing temperatures showed that ethylene dibromide moves almost as rapidly through the soil at 34° F. as it does at 65° F. However, the rate of vaporization of the liquid fumigant is considerably reduced at the lower temperature, resulting in increased exposure time at lower gaseous concentrations.

Petroleum solvents were not found to aid the diffusion of ethylene dibromide through the soil. They seemed to slow down the rate at which this liquid fumigant vaporized.

INSECTICIDE RESIDUES ON FORAGE AND CEREAL CROPS IN RELATION TO CONTAMINATION OF ANIMAL PRODUCTION INTENDED FOR HUMAN CONSUMPTION, R. H. Carter, P. E. Hubanks, E. W. Poos, T. N. Dobbins, U.S.D.A., Bureau of Entomology and Plant Quarantine, L. A. Moore, and Ray Ely, Bureau of Dairy Industry, Beltsville, Md.

Control of insects affecting forage crops has become increasingly important. Parts or all of these crops find their way eventually into animal feed. Use of some of the newer insecticides has already been made against some of the insects that attack grain and forage crops, as for instance DDT for corn earworm, European corn borer, leafhopper on peanuts, lygus bug on seed alfalfa, vetch weevil, and white fringed beetle; aldrin, chlordane, and toxaphene for grasshopper and army worm; parathion and tetraethyl pyrophosphate for greenbug on small grains and pea aphid on alfalfa; ryania for European corn borer and sugar cane borer.

Some, such as DDT, TDE, chlordane, methoxychlor, and mixtures of pyrethrins and piperonyl butoxide are useful in killing stored-grain insects persisting in cracks and crevices of empty bins.

Insecticide residues on feed crops are of importance in relation to their efficiency against insects, their effects on farm animals consuming the crops, and the contamination of animal products intended for human consumption.

The amount of residue at harvest time obviously depends on the quantity applied, the rate of growth, and weathering climatic conditions, volatility of the compound, and other factors. Residues of DDT, toxaphene, and methoxychlor up to 100 or more ppm have been found on alfalfa hay which had been treated during the growing season with one or two pounds per acre. Chlordane and BHC residues are lower, but may persist for several weeks unless climatic conditions are especially severe. Parathion and tetraethyl pyrophosphates are much more volatile and unstable and their residues are probably negligible after two or three weeks.

Feeding tests with alfalfa containing insecticide residues have been conducted with farm animals. Milk and tissue from the test animals have been analyzed for the presence of the insecticide compounds. DDT has been found in the milk in practically all feeding tests where the compound was present in the hay. Chlordane, toxaphene, and methoxychlor have not been detected in milk from cows fed on hay treated with these materials.

RADIOACTIVE TRACER STUDIES IN INSECTICIDE BIO-CHEMISTRY, F. P. W. Winteringham, Pest Infestation Laboratory, London Road, Slough, Bucks, England.

Methyl bromide has been widely used for fumigating infested cereals. It had been established that the bromide of chemically combined methyl bromide residues in the fumigated cereals could be accounted for as water-soluble inorganic bromide. In order to study the parallel fate of the methyl group of the fumigant molecule, milled wheat was exposed to carbon-14 labelled methyl bromide under the conditions of fumigation. Samples of the fat, starch, protein, etc., were separated from the fumigated wheat. The carbon-14 content of these fractions, determined radiometrically, was a measure of the relative degrees of methylation of each fraction. Most of the combined ethyl group were found in the protein of the wheat as sulphonium, thiomethoxy, methoxy, and N-methyl derivatives.

The development and discovery of insects resistant to DDT and to other insecticides has become a problem of fundamental and practical importance. A radioactive bromine analogue of DDT was injected into DDT-susceptible and into DDT-resistant insects. Decomposition of the insecticide *in vivo* was followed in single insects by a form of reversed-phase paper-partition chromatography in which insecticide metabolites were characterized and estimated radiometrically.

THE EFFECTS ASSOCIATED WITH TOXICITY AND PLANT TRANSLOCATION OF THREE PHOSPHATE INSECTICIDES. M. M. I. Zeid and L. K. Cutkomp, Division of Entomology and Economic Zoology, University of Minnesota, St. Paul, Minn.

The comparative acaricidal and insecticidal toxicity of octa-methyltetramide pyrophosphate (OMPA), O,O-diethyl O-p-nitrophenylphosphate (para-oxon), and O,O-diethyl O-p-nitrophenylthiophosphate (parathion) have been studied. Para-oxon produced especially high initial toxicity as an acaricide (tested against the two-spotted spider mite, *Tetranychus bimaculatus*). Both para-oxon and parathion produced fairly high mortality of mites by vapors alone, while the compound OM PA had no significant vapor toxicity.

The well-known systemic effect or

Many phases of weed control, new fungicides, promising new insecticides and improved manufacturing methods for fertilizers covered in papers presented at American Chemical Society meeting in New York and Washington, this month.

plant translocation of OMPA was checked quantitively in the broad bean plant, using a bioassay of untreated leaf extracts against larvae of the mosquito, *Aedes aegypti*. An estimated 40 per cent of OMPA or an active toxin formed from it was evident in untreated lower leaves of a growing plant when the chemical was applied to upper leaves of the plant. In the case of para-oxon about 7 per cent activity was evident on the same basis.

Our evidence does not appear to support the reported finding of DuBois, Doull, and Coon (*J. Pharm. Exp. Ther.* 99: 376-393. 1950) that OMPA is converted to an anticholinesterase agent within the plant, although some explanation of the differences may be possible. We also have found a fairly high toxicity (1 ppm) of the pure chemical when tested against mosquito larvae (*Aedes aegypti*). In general, OMPA has shown low toxicity to most insects and high toxicity only when applied to plants.

The translocation of OMPA and para-oxon in plants was found to have many points of similarity with the translocation of the heribicide, 2-4-dichlorophenoxy acetic acid and related compounds.

DECREASED TOXICITY AND CHOLINESTERASE INHIBITION IN A NEW SERIES OF DITHIOPHOSPHATES. G. A. Johnson, J. H. Fletcher, K. G. Nolan, and J. T. Cassaday, Stamford Research Laboratories, American Cyanamid Company, Stamford, Conn.

Parathion, O,O-diethyl O-(4-nitrophenyl) thiophosphate, is an unusually effective insecticide, toxic to man as well as to insects. However, proper handling reduces the danger to a considerable degree. It is one of a group of cholinesterase inhibitors, which in general, bear a direct relationship between *in vitro* cholinesterase inhibition and *in vivo* toxicity to bees and flies. The few exceptions are in the direction of decreased *in vivo* toxicity relative to the *in vitro* toxicity. Unfortunately, most of the phosphate esters of high anticholinesterase activity have shown an extremely high toxicity to mammals.

A new series of dithiophosphate esters has been discovered which has insecticidal value. An example of this series is Experimental Insecticide 4049, S-(1-2-dicarbethoxyethyl) O,O-dimethyl dithiophosphate. It shows less cholinesterase inhibition than parathion. The molar concentrations for 50% cholinesterase inhibition in mouse brain and in bee brain have been determined for both compounds. The ratio of the concentrations for mouse brain to that for bee brain is greater for Experimental Insecticide 4049 than it is for parathion.

ETHYL p-NITROPHENYL THIONOBENZENEPHOSPHATE (E PN) - CHEMICAL CHARACTERISTICS, BIOLOGICAL ACTIVITY, AND PESTICIDAL USE. S. S. Sharp, Grasselli Chemicals Department, E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.

EPN and related alkyl mononitrophenyl thionobenzenephosphates may be synthesized by a two-step process from thionobenzenephosphonyl dichloride, and sodium nitrophenate. The thionobenzenephosphonates as normally produced are stable, heavy, yellowish oily liquids of a low vapor pressure. EPN itself has been obtained as a crystalline solid.

Extensive field evaluation during the past three years has shown that EPN formulations constitute effective chemical control measures for many mite and insect pests of major agricultural importance. EPN is compatible with most standard pesticides and is safe at recommended levels on a wide range of plants.

Herbicides Discussed

AMONG the papers presented on the subject of weed and brush control, along with discussion of properties of chemical herbicides, were the following:

PREFERENTIAL RESISTANCE TO CHEMICAL CHANGES DUE TO SOIL MICROORGANISMS OF THE SUBSTITUTED AMIDES OF 2,4-D, J. M. F. Leaper, American Chemical Paint Co., Agricultural Chemicals Division, Ambler, Pa.

The apparent inactivation of 2,4-D in the soil in a comparatively short time has been well established. It is the general conclusion of most investigators that microorganisms of types not yet definitely identified are responsible for the breakdown of the 2,4-D molecule into fragments which have little or no herbicidal or hormone reactions. In fact, the addition of a further quantity of 2,4-D in soil which has already gone through such an initial phase, results in an accelerated inactivation. In most of the work done, the water soluble salts of 2,4-D were used in the experiment. No recorded work has included the substituted amides of 2,4-D as the test material.

Certain results obtained in so-called "pre-emergence" field tests where some 2,4-D derivatives appeared to affect weed seedlings over a much longer period of time than the ordinary forms of 2,4-D, have not readily been explained. The most outstanding compounds in this respect were the substituted amides and especially the anilides.

Why do these anilides exert their herbicidal effects over so much longer a period than the simpler derivatives of 2,4-D? Is this primarily due to their greater resistance to the action of the microflora? To answer these questions, a quantity of soil was thoroughly mixed with a definite amount of 2,4-D on the one hand and of three typical substituted anilides of 2,4-D on the other. This mixture was exposed to the atmosphere for a period of two months. Any 2,4-D or 2,4-D derivatives remaining in the soil were then extracted with acetone and hydrolyzed with alcoholic potash and after removing any other acetone soluble material by suitable methods, the 2,4-D was determined as such by titration.

The results obtained indicated that the three acetanilide derivatives used, i.e. 2,4-dichlorophenoxy acetanilide, 2,4-dichlorophenoxy, 2,5-dichloroacetanilide and 2,4-dichlorophenoxy 4-hydroxy acetanilide were still present in the soil in amounts varying from 68 to 81% of the original amount, whereas the soil which had contained the plain 2,4-D had now only 3% remaining of the original quantity.

COMPARISON BETWEEN METHOXONE, 2,4-D AND 2,4,5-T AS WEED AND BRUSH KILLERS UNDER SWEDISH CONDITIONS, E. Aberg, and E. Hagsand. Institute of Plant Husbandry, Royal Agricultural College, Uppsala 7, Sweden.

Yield and plant injury evaluations of methoxone, 2,4-D and 2,4,5-T have been conducted to elucidate differences in activity. Experiments in Sweden have demonstrated a greater injurious effect on winter wheat, as determined by yield, for 2,4-D than for Agroxone. In other tests, in which methoxone and 2,4-D were compared at equivalent rates on winter wheat, marked yield differences were noted where spraying was done 33 days after emergence, and the 2,4-D treated wheat exhibited onion-like leaves; spring applications also showed a greater proportion of growth abnormalities for the 2,4-D-treated wheat. Similar work on

(*Turn to page* 104)

Light aircraft dusting BHC for control. Such operations treat some 40,000 coffee trees a day: a tremendous step ahead of the tedious methods of old.

Brazil Hails Era of Modern Pest Control

BRAZILIAN coffee planters will shortly start on their fifth year in a program of application of benzene hexachloride which has been successful in bringing under control the "Broca" (Hypothenemus Hampei) pest which, a few years previous, was threatening the survival of this principal Brazilian agricultural crop. BHC is being produced locally at the Matarazzo chemical plant, as well as by the duPont works in Sao Paulo, both of which turn out upwards of 1,000 tons of BHC concentrate annually. Additional tonnages are imported, bringing Brazil's annual insecticide bill to well over fifteen million dollars.

This important tobacco pest was first reported from Brazil in 1924, apparently having been introduced along with seed from Java and Sumatra. The "Broca" is a small bug which drills holes through the green coffee fruit, nesting in the inner part of one of the bean halves, and feeding on the core of the bean. It drills numerous tunnels and channels through the bean, gaining its nickname from the Portugese word "broca" which means to drill.

Rapid spread of the infestation followed first introduction of this pest, and the following control program was quickly adopted:

CULTURAL MEASURES: *Preventive Harvesting* of already attacked fruits, thus avoiding the spreading of Broca from one bean to the next one.

Second Harvest: After the crop had been harvested, an additional check was made, picking every single fruit left, on the ground or on the tree to avoid leaving any Broca waiting for the new crop to develop.

LEGAL MEASURES: Strictly enforced prohibition against the transfer of empty coffee bags from one region to another, as well as seeds, to keep a check on the infested areas.

BIOLOGICAL MEASURE:
The Uganda bee (see below)

CHEMICAL MEASURES: Fumigation of used bags and of harvested beans, before drying, with carbon bi-sulfide, to avoid bringing Broca from freshly harvested beans into contact with previously picked non-infested coffee.

This initial program was comparatively ineffective in preventing spread of the "Broca," largely because no insecticides then available were effective in providing adequate chemical control. An answer to the problem was sought in biological control, through employment of the Uganda bee, with comparatively poor success however. The Uganda bee, it was found, was being employed in British East Africa, where the same parasite was attacking coffee plantations. Arrangements were made to bring a large number of Uganda bees to Brazil. Research laboratories attempted to breed the parasite artificially in order to make it available in large amounts to the infested areas. Unfortunately however, since the parasite lives exclusively on Broca, and Broca cannot be bred artificially in laboratories, the only solution seemed to be the release of a limited number of the bees in every infested area, hoping for their natural multiplication. On plantations where there was plenty of Broca, the Uganda bee multiplied at a fast rate, eating up the Broca and its eggs, even inside the already drilled fruits. However, at the same rate the Broca finished, the Uganda

(Above Helicopter of Basic Economy Corp. in action dusting B H C on coffee plantation. Operation is performed in late afternoon at which time coditions for spraying are usually best.

This Hand-operated type duster mounted on a mule cart. This kind of equipment at best covers only 4.000 trees a day. Another liability is outfit's lack of accuracy.

Group of dusters line up for inspection before "operation Broca". Most farms own fleets of equipment similar to those shown here . . . drawn by either tractor or mule.

bees, having nothing to live on, disappeared too fast to give effective extermination.

And with cost and availability of labor becoming an increasing problem as the years went on, the "cultural" preventive measures employed became more impractical, leading to a serious increase in the country-wide infestation. The Instituto Biologico was set up in Sao Paulo, with one of its important jobs being to find an answer to the pest which threatened ruin to Brazil's important coffee industry. First real progress followed the introduction of the many new potent insecticides that were developed during World War II.

Chemical Control

EARLY in 1947 the "Assistencia Fitossanitaria" (Pest Fighting Division) of the Instituto tried new experiments in the field, and the privately-owned farm "São José da Figueira Branca" in Galia, State of São Paulo, became the proving ground where, under the direction of Dr. C. A. Seixas, assistant researcher of the Instituto, after exhaustive tests, it was discovered for the first time that Broca could be controlled chemically. During the tests in Galia, Dr. Seixas' staff made tests with the following insecticides. DDT at 5% and 10% concentrations benzene-hexachloride (BHC) at 2%

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TOXICHLOR
(CHLORDANE)
DED-WEED
(2,4-D)
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(DDT)
TRI-6
(BHC)

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"Herbicide 1" Offers New Technique for Agricultural

Chemical Weed Killer

by

T. P. Finn

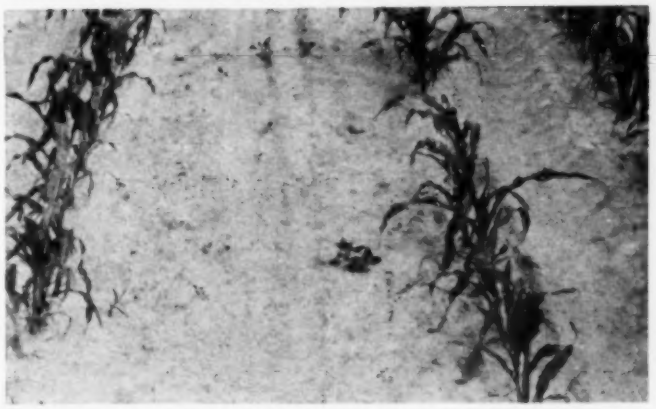
Carbide & Carbon Chemical Co.,
Division of
Union Carbide & Carbon Corporation
New York

TWO general types of weed control chemicals — contact and growth regulating herbicides, have been investigated in the past. The contact herbicides, such as the dinitros, destroy weeds by being phytotoxic to their foliage. The growth regulating materials, such as 2,4-D compounds, usually affect plants by absorption through the foliage or root system, upsetting their normal physiology.

Both types of herbicides, however, have limitations since the development of weed and crop seed is often simultaneous. The use of preemergence treatments of contact herbicides is generally impractical. Growth regulating herbicides, on the other hand, often cause injury to the crop or near-by sensitive plants.

The unique properties of sodium 2,4-dichlorophenoxyethyl sulfate, ("Crag Herbicide 1*,") enables it to avoid many of these limitations. This herbicide may be classified as a germinative seed toxicant. The new material has the ability to kill or stunt germinating weed seeds without affecting established plants, such as strawberries; or seeds such as corn sown deeply in the soil. In addition, it has the property of being non-injurious to plants when sprayed or dusted directly on the foliage at concentrations that will kill germinating weed seeds in the soil. The herbicide was developed and tested in the laboratory and greenhouses of Boyce Thompson Institute for Plant Research in Yonkers, New York and later, was given extensive field testing by experiment stations and the Seabrook Farming Corporation, Bridgeton, New Jersey, under practical growing conditions.

Many practical applications for weed control are suggested by its unusual properties. To date it has been used commercially for controlling weeds in strawberries and, in large field trials, in sweet corn, asparagus, potatoes, sugar cane, onion sets, and gladioli.



Weed control in sweet corn (var. Golden Cross). Above photo is the untreated check plot; lower picture shows corn following a 2 lb. per acre application of "Herbicide 1." Application made on July 28; photograph taken on August 24. (Photos by Seabrook Farms, Bridgeton, N. J.)

* Trade-mark of Union Carbide and Carbon Corporation.

The problems of vapors and drift from herbicides causing injury to near-by crops are well known. Such problems have not been encountered with "Crag Herbicide 1" because the material is non-volatile and harmless to foliage at the suggested concentrations. An illustration of this property is seen when this herbicide is compared with 2,4-D. When "Crag Herbicide 1" and the sodium salt of 2,4-D were sprayed on the foliage of tomato plants at concentrations of 10, 100, 1000 p.p.m., all the 2,4-D concentrations were injurious, but "Craig Herbicide 1" proved to be non-injurious.

Mode of Action

UNDERSTANDING the mode of action of "Crag Herbicide 1" helps to explain its safety in controlling germinating weed seeds in established plants or deeply-seeded emerging crops. Laboratory and greenhouse tests have revealed that in water solution, the herbicide has no effect on the germination or growth of cucumber seeds. However, when a small amount of soil is added to a solution in similar tests, root and shoot growth is greatly inhibited and the severely stunted seedlings eventually die. Further tests have indicated that the herbicidal properties of "Crag Herbicide 1" are probably due to the ability of microorganisms in the soil to convert the chemical into an active germinative seed toxicant.

Cultures were set up in which herbicide solutions were added to Petri dishes that contained either sterile (without living soil microorganisms) or non-sterile soil. Then cucumber seeds were placed in the dishes and examined five days later. Severely stunted seedlings were observed in the non-sterile cultures. Seeds germinating in the sterile cultures were not affected and maintained the same growth rate as the seedlings to which no "Crag Herbicide 1" had been added. These tests indicate that the material must come in contact with moist soil to be converted to its active form. Hence, when the material is sprayed on the foliage, no herbicidal action should take place because the chemical is not yet in its active form.

Since ideally, "Crag Herbicide 1" should be applied as weed seeds are germinating, this suggests applying the herbicide before weed seedlings are visible, whether it is to be used in seeded crops or following cultivation in annual, biennial, or perennial, established row crops. Good weed control can be obtained, however, with application as the weeds are emerging, provided they are not more than ¼ to ½ inch in height. At practical dosage levels, the herbicide will not control already established weeds.

The control of weeds in plantings of asparagus and corn has always been a major problem to growers. Because this new herbicide showed promise in weeding these crops, a co-operative weed control test was set up by Carbide and Carbon Chemicals Company, manufacturer of "Crag Herbicide 1," and the Seabrook Farming Corporation of Bridgeton, New Jersey.

In asparagus fields in southern New Jersey, weeds are a particularly pressing problem during the cutting season. To control weeds in the asparagus rows during this time the usual practice is to hill the rows (throw soil on the row in an attempt to cover the weeds) while cultivating between rows. The asparagus spears must push through this additional soil before they can be harvested. When the weed problem is severe it often becomes necessary to disc the field level during the cutting season with a resulting loss in yield. If a herbicide could be used to control weeds during harvest, frequent hilling would not be necessary and higher yields could be realized. It was thus decided to try this herbicide throughout the season, starting after the last disking as spears were starting to emerge.

Application was made uniformly to the soil surface at the per acre rate of 2 lb. in 40 gal .of water, just before emergence of the weeds. Two additional applications spaced approximately three weeks apart were made during the cutting season. Before each application, the plots were cultivated but not hilled so that the soil surface in the asparagus row remained undisturbed.

The untreated plot was cultivated in the same manner. Weeds developing in the row were not destroyed. After the cutting season the field was disked. A week after disking, during the early fern stage, a fourth application of herbicide was made at the rate of 2 lb. per acre.

The control of both broadleaf and grass weeds was excellent. The

(*Turn to page 93*)

Test to determine the ability of soil to activate "Crag Herbicide 1." Left: seeds grown in untreated non-sterile soil. Right: seeds grown in non-sterile soil treated with 100 p.p.m. of the herbicide.

The Listening Post

New Fungicide-Insecticide Application

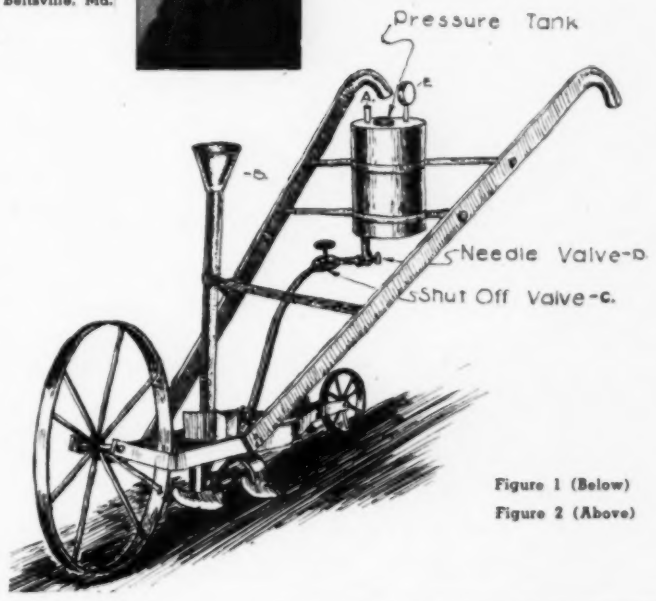
This department, which reviews current plant disease and insect control problems, is a regular monthly feature of AGRICULTURAL CHEMICALS. The comments on current plant disease problems are based on observations submitted by collaborators of the Plant Disease Survey Bureau of Plant Industry, Soils, and Agricultural Engineering, U. S. Department of Agriculture, Beltsville, Md.

By Paul R. Miller

A NEW method and equipment recently employed on the mucklands of New York in the control of onion smut and maggot by blowing a fungicide-insecticide mixture into the furrow along with the seed, has been described by A. C. Newhall and W. W. Gunkel, Cornell University. The method has aroused wide interest, not only because it promises better control of these two onion pests but because it may lend itself to the control of other seedling diseases and insect pests of a wide variety of crops by a single operation at the time of sowing seed.

As used in 1950, a root rotary hand duster, model 3c, is mounted on the handles of a "Planet Jr." B36- 3-row drill drawn by a 1½ h.p. walking tractor. The blower is turned by a bicycle chain so that it operates only when the clutch is engaged and the tractor is moving forward. The tractor's wheels are geared to the lower and upper sprockets so that at ordinary rates of walking the blower operates at about the right speed. The outlet of the blower is divided so the dust is applied to two rows through 1¼-inch flexible tubing, leaving the third row for a check. A quick way of detaching the duster for weighing would be highly desirable on an experimental model like this. Since in practice the dust flow regulator was seldom completely opened, the duster would seem to have sufficient capacity for several more rows provided even distribution can be obtained.

In 1949 field tests, the same blower was mounted on a single-row hand-operated drill. Smut was not very serious in the six fields where tests were made and the data obtained were not very striking, although significant. In 1950, with the 3-row tractor-drawn equipment illustrated in Figure 1, tests were made on 20 farms and significant data obtained from over half of them. Several were blown out. The following fungicide mixtures gave rather good



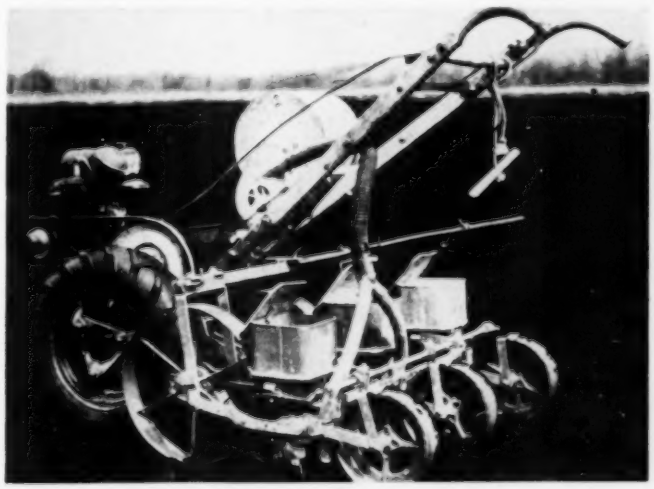


Figure 1 (Below)
Figure 2 (Above)

control of smut at 20 to 30 pounds per acre (1) thiram-"Pyrax" 1:1, (2) "Tersan"-"Pyrax" 1:1, (3) "Tersan"-insecticide 1:4, (4) "Orthocide"-"Pyrax" 1:1. Of special interest is the "Tersan"-insecticide mixture because even at 30 pounds per acre only about 3 pounds of active thiram was applied on 7 miles of row which is near the optimum according to Linn's recent work in Illinois with onion seed pelleting reported earlier in the "Listening Post."

This fungicide-insecticide mixture consisting of one pound of "Tersan" (50% thiram) to four pounds of dieldrin dust (25% active), which had already been found to give remarkable control of onion maggot in the summer, was given further tests in September on four muck farms where a crop of onions had just been removed. Thrips were evidently abundant in the soil and during the month they destroyed most of the seedlings in the check plots but left the treated rows alone, so that 30 days after sowing the stands in the untreated rows were reduced to one third of those in the treated rows (Table 2).

The successful use of such small amounts of fungicide and insecticide per mile of row (0.5 pound and 0.8 pound active) suggests that it might be profitable to try the method on other crops, such as beans, corn, cotton, or whatever crops, sown from seed, are attacked by thrips, stem rots, and maggots or wireworms in the seedling stages. The protection of cotton seedlings from thrips and damping-off in this manner might conceivably hasten the maturity of the crop and increase yields in critical regions where the season in short.

Soil Fumigants vs Root Rot

ACCORDING to R. D. Watson of the Idaho Agricultural Experiment Station, soil fumigant fungicides have been used very little in control work because a high per-acre cost which has restricted their use, and the lack of complete eradication of the organism. Many of the most serious diseases in Idaho are caused by soil-borne fungi, and usually the only practical control has been to rotate the crops. The increased acreage given to cash crops has intensified the problem. This has been true of the so-called "root rot" on peas and beans caused by several fungi, of which different kinds of *Fusarium* are the chief offenders. The root rot is a stem and primary root decay that often girdles the plant near the seed attachment region early in the season, leaving only the secondary roots to support the plant to maturity

These diseases are widespread and present a major problem. Soil sterilization with soil fumigants is not practical on these crops with present methods.

Seed treatment tests indicated that some control could be achieved by heavy dosages of fungicide at the seed level, since much of the "root rot" develops at or near the seed piece attachment. Since seed treatment did not offer a solution, a new method of application of soil fumigants was tried. A fungicide was sought that could be applied with the seed so that it would sterilize a local area and be dissipated before causing injury to the seed. A drip process based on the onion smut control method was used. It offers a fresh approach for the wider use of the newer soil fumigants in plant disease control.

A simple attachment has been adapted to the planter to apply the fungicide with the seed (Figure 2). Using methods already developed for use on nematode control, the fumigants can be placed below the seed level should that be necessary for the control of certain diseases. This method of applying fungicidal fumigants for disease control may have a wide application with little change in present practices.

In the preliminary greenhouse and field tests in 1950 two products were used, formeldehyde and Shell product O.S.840. In 1951 the name O.S.840 was changed to "CHP-55." This material is technical chlorobromopropene. From the first tests there appears to be a wide range of practical concentrations between the toxic

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Table 1.
Some field results in the control of onion smut by blowing dust into furrow with the seed, and by seed pelleting.

Farms Treatment	Percent smutted seedlings 1	2	3	4	5	Yields in bu. per acre 1	2	3	4	5
Check	19	22	23	23	48	326	166	337	487	—
Thiram + Pyrax blown in	.3	—	—	.3	—	670	—	—	936	—
Tersan + Dieldrin blown in	.5	5.6	4	—	—	530	648	714	—	—
Tersan + Pyrax blown in	—	—	—	—	4	—	—	—	—	—
Tersan pellets	.2	7.6	15	1	15	690	463	753	923	—
Orthocide pellets	1.6	2.6	6	.9	23	670	390	695	1043	—

Table 2.
Control of thrips on seedlings by blowing Tersan and Dieldrin into furrows while sowing seeds

Mean stands of onion seedlings per 60ft. of row after 30 days (highly significant)	*Check*	*Dusted*
Farm 1	91	259
2	81	261
3	42	139

Listening Post *(Continued)*

This column, reviewing current insect control programs, is a regular feature of AGRICULTURE CHEMICALS. Mr. Dorward is connected with the department of Insect Pest Survey and Information, Agricultural Research Administration, Bureau of Entomology and Plant Quarantine, U. S. Department of Agriculture, Washington. His observations are based on latest reports from collaborators in the U. S. Department of Agriculture's pest surveys extending throughout the United States.

By Kelvin Dorward

CURRENT information regarding the occurrence, distribution, and abundance of insect pests is of importance to American agriculture as a basis for the proper application of control measures to insure continued high production of food, fibre, and other essential crops. This is true in normal times when current knowledge of insect conditions makes possible the intelligent and effective application of control measures to prevent unnecessary losses and aid in the production of better products. But in periods of national emergency it becomes of even more vital importance when production of essential crops must be maintained, often in the face of insecticide shortages. Unsettled international conditions create the added problem of possible deliberate introduction of new pests from abroad or the possible spread through hostile action of injurious insects that now occur only in limited areas of this country. These factors emphasize the need for expanding and strengthening facilities for keeping all agencies and individuals concerned with agricultural production currently and adequately informed at all times with regard to the status of insect pests throughout the United States.

Surveys are recognized as the most accurate method of determining the presence of new insects or abundance of old and many of them are conducted each year in the United States. Some are conducted independently by States, some by the Federal Government and some by other agencies. Quite often insect surveys are conducted cooperatively but all with the common goal—the better knowledge of the occurrence, distribution, and abundance of insect pests that either attack or threaten agricultural crops, livestock, forests, and man.

It is impossible for any one agency alone to collect and disseminate adequate current information on the status of all economic insect pests. Recognizing this, Avery S. Hoyt, Chief of the Bureau of Entomology and Plant Quarantine, recently wrote the Experiment Station Director, the Director, Commissioner or Secretary of Agriculture, and the Extension Director of each State and the territories of Alaska, Hawaii and Puerto Rico relative to a plan for strengthening cooperative insect surveys in the United States, not only from the viewpoint of an emergency measure but as a permanent service to agriculture. In the communication it was suggested that consideration be given to the possibility of establishing a clearing house in each State for channeling the information to the Bureau's Division of Insect Survey and Information in Washington so that comprehensive current reports on economic insects could be prepared and released at frequent intervals on a nation-wide basis.

Response to this proposal was gratifying. The majority of replies indicated a realization of the need and desire of the agricultural workers of the country for a more current and complete cooperative economic insect reporting system. Twenty-eight States and the territories have named an individual or office to act as a clearing house for insect information. Other States have stated their willingness to cooperate.

Although the original communication was for the purpose only of obtaining the opinions of the States regarding an expanded insect reporting system, there was an immediate increase in the number of insect activity reports received. This spontaneous increase in the number of reports and the interest expressed made it apparent that it would be desirable to release the cooperative information report more currently than in past years. In view of these facts, for the remainder of the 1951 season, a cooperative report will be released every two weeks rather than on the monthly schedule previously followed. The first issue of the new *Cooperative Economic Insect Report*, assembled in the Division of Insect Survey and Information, was released July 31, 1951. To make the report serve its most useful purpose, it is planned that it will be issued weekly beginning in 1952.

The Bureau hopes that industry entomologists as well as State and Federal workers, will make available their current observations on economic insect conditions to be included in this cooperative undertaking.

Insect Distribution

THE boll weevil was widely distributed in late July but infestations generally were lighter than in 1949 and 1950. The few scattered serious infestations occurred mainly where 1950 cotton stalks were not destroyed before frost; where fields were near favorable hibernating quarters, or where insecticides were not properly applied. The 1951 weevil populations are being attributed to hot, dry weather in most of the boll weevil infested States, the activity of natural enemies, and the widespread, careful, use of insecticides. More insecticides are being used in 1951 than any previous year except 1950, including possibly 1949.

The first cotton leaf worm recorded in 1951 was reported from Cameron County, Texas on July 17. The latest date on record for this species is July 18, 1949. This record came from Calhoun County, Texas.

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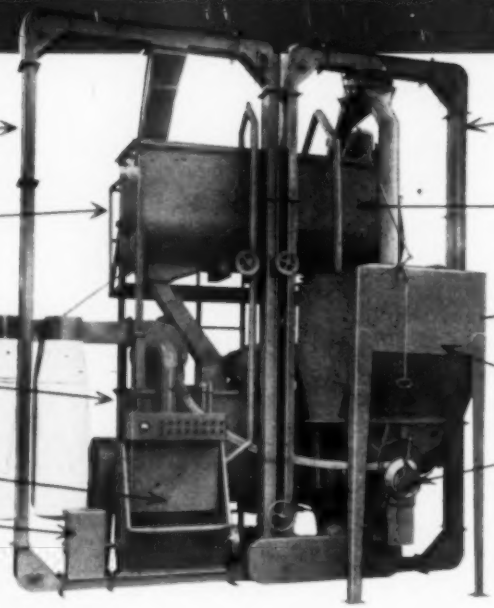

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Washington Report

AS a result of a procedure worked out by the DDT Producers Industry Advisory Committee in conjunction with the National Production Authority and the Office of International Trade, OIT has been authorized to issue DO priority ratings for approximately 15 million lbs. of technical DDT to carry out government sponsored and other programs abroad during the year beginning July 1, 1951. Under the plan, priority assistance will be extended to exporters to obtain deliveries of DDT and DDT formulations for ECA, Point 4, United Nations International Childrens Emergency Fund, and other health and agricultural programs in foreign countries. It was estimated that these various foreign programs would require about 20 million lbs. of the equivalent of technical DDT during the balance of 1951, but it was proposed to allow the issuance of ratings for only 15 million lbs. during that time. Whenever an export license is granted by OIT, there will be an automatic DO rating given to such an order. To receive assistance, exporters are to send a letter of request to OIT along with the application for export license covering the proposed shipments. Details must be given as to the end uses and efforts previously made to obtain DDT without a priority rating. In approving requests for supply assistance, OIT will assign DO W-4 ratings to applications covering ECA countries and DO W-2 ratings for exports to other nations.

Much concern was expressed by large domestic consumers of DDT since export programs will automatically carry priority assistance while many domestic uses will not carry such a rating. However, DO's set aside are limited by regulation and no greater than a certain percentage of each producer's monthly production is to be set aside for priority-assisted procurement. Moreover, the DO-21 rating for military procurement will be included in this DO set aside, and it is generally felt that about 20% of production for the balance of 1951 will go into these channels. There will still be 80% production available for domestic consumption.

* * *

It is now estimated that DDT production for the calendar year 1951 will run about 90-95 million lbs. basis technical DDT. However, the program as recently lined up by the Chemicals Division of NPA calls for a production of 105 million lbs. for the period from July 1, 1951 to June 30, 1952. It has been shown that there is an adequate amount of DDT capacity in the United States to take care of this quantity of material, but assurances will have to be made that there will be sufficient chlorine, benzene and sulfuric acid made available to DDT producers to attain this production. This program has been undertaken by the Chemicals Division of NPA.

* * *

The Phosphate Rock Industry Advisory Committee have asked the Office of Price Stabilization to issue a tailored regulation allowing an escalator clause to operate. It was pointed out that the price of Florida phosphate determines the market and Florida contracts historically contain escalator clauses which permit price adjustments when fuel and labor costs go up.

However, it was emphasized that under the provisions of general ceiling price regulations, nothing can be done about the higher costs.

Further, the committee rejected as "unworkable," an OPS formula embodying principles of the manufacturer's price regulation CPR-22 pointing out that it would not bring sufficient relief. Therefore, as the only alternate, it was pointed out that a tailored regulation would be the only answer.

* * *

Late in July, the State Department presented a program for Congressional approval calling for an expenditure of $80,000,000 for American aid for five South Asian nations which will stress increased food production. It was pointed out that the proposed assistance will yield large returns in strengthening the free world and furthering U. S. security interests. Introduction of American control methods, increased use of fertilizers and pesticides were an essential part of this program.

* * *

Agricultural pesticide producers told the Office of Price Stabilization that a tailored industry pricing order should await stabilization of raw material prices.

The group pointed out that once prices for DDT, BHC and other chemicals had been established, the pesticide industry and OPS would then proceed to formulate the special regulation.

The meeting of pesticide processors and formulators also pointed out that some segments of the industry can operate satisfactorily under a manufacturer's general ceiling price regulation CPR-88, but a way of pricing new formulations without waiting for specific OPS approval is needed. They also emphasized that in any tailored order, the preferred form would be to apply pre-Korea markups to current costs in computing ceilings. The group also discussed possibilities of developing industry-wide cost adjustment factors under CPR-88 but was unable to agree on a base period.

* * *

Uncertainty over the effect of price and supply of materials beclouds the picture for the agricultural chemical producer and distributor at the start of the new fiscal year, October 1, 1951. The recent action of Congress insofar as the OPS price rollbacks and price forwards are concerned, plus the supply shortages of materials due to intensified mobilization. These are double blows which must be absorbed in intelligent planning for the coming year.

In mid-August, OPS announced an indefinite postponement of the mandatory effective date of six basic manufacturing regulations. The purpose was stated to preserve the status quo until OPS could issue regulations to

(Turn to page 91)

Sulfuric acid for the free world

Approximately 40% of the free world's contact sulfuric acid is produced by Monsanto-designed plants, using Monsanto Vanadium Catalyst. There are more than 250 Monsanto-designed units, using all known raw materials and serving 25 countries.

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Technical Briefs

Bean Beetle Control

Mexican bean beetles, the major pest of beans in New York State, are controlled with rotenone dust; and sprays containing ground cube root or parathion are also effective, it has been found.

One application of a one per cent rotenone dust applied as the eggs are hatching in mid-July is generally sufficient, according to workers at the Experiment Station, Geneva. Unusually heavy infestations may require a second treatment within a week or ten days. The dust must reach the undersurface of the leaves where the young grubs are feeding. A one per cent parathion dust will also give excellent control but must be used with caution.

Spray preparations found satisfactory against the Mexican bean beetle include one pound of 15 per cent wettable parathion in 100 gallons of water or four pounds of ground cube root plus two pounds of skim milk powder, or some other spreader, in 100 gallons of water.

Injury from the Mexican bean beetle shows up on the foliage in a lacelike appearance due to the feeding of the insect on the green tissue between the veins of the leaves, the Station scientists say.

Leafhoppers which sometimes occur on beans and cause more or less injury to the leaves are easily controlled by adding two per cent DDT to the rotenone dust for the bean beetle, thus controlling both pests with one dusting.

•

Sprout Clearance Project

Thompson Horticultural Chemicals Corporation, St. Louis, Mo., after conducting extensive research in Taney and Boone Counties, Arkansas, reports on a spraying operation with chemicals to control sprouts and brush.

"A 160 acre hog back was sprayed by plane with weedicides and bramblecides," the report says. The area was so choked with sprouts that it was just about worthless as grazing land and almost impassable. Almost immediately following application, the weeds at ground level curled up and died, indicating that the spray had penetrated through foliage so dense that it choked all grass growth. Within ten days the foliage turned brown and tourists along Highway 65 were no doubt surprised to see autumnal jack lanterns waving in May.

"A heavy beating rainstorm a few days after application helped answer the question whether the sprouts and worthless trees were really dead or merely injured. The rain whipped all the foliage from the trees, leaving the hog back bare and exposed to the sun. In fact, study of the land indicated that the sun began to penetrate almost immediately after spraying. Native blue stem grass seeds, long dormant in the soil, began to sprout and six weeks later a rich crop of grass was growing." It will be adequate for winter pasture this year, according to the report.

Land clearance, according to the Thompson figures, can be undertaken at a cost of less than ten dollars per acre. The precise cost depends on the density of the sprout growth and the method employed to spray on the bramble-weedicides; whether by plane, tractor or knapsack.

More concentrateed formulas are needed in denser areas. Cost also is determined by the number of pounds of esters in each gallon of chemical. Watered-down solutions are not always cheapest.

Figures indicate that sprout-ridden land which could support only ten to fifteen pounds of beef to the acre, often produces as much as 100 to 150 pounds per acre once the land is cleared and turned to pasture. Thus, as a financial undertaking, chemical sprout clearance is regarded as good business.

Agricultural experts and officials are reported predicting that the Ozarks, potentially one of the finest cattle regions in the country, are in line for an agricultural revolution equal to the boom that the Iowa and Illinois corn regions enjoyed when hybrid strains proved their value. In any event, many land owners are reported to have been following the Thompson firm's spraying tests with close attention and several intend to clear their land.

•

Allethrin Toxicity

Two separate inhalation studies on aerosols containing 1 per cent by weight of allethrin or of pyrethrins, 9 percent of peanut oil and 90 percent of "Freon 12" were carried out at concentrations in excess of 50 Gm. of total formulation per 1,000 cu. ft. of space.

In the first study, laboratory-produced allethrin and the comparative aerosols caused no detectable injurious effects on rats exposed twice daily for 30-minute periods up to a total of 85 such periods within 67 calendar days. In a second similar study a sample representing commercially produced allethrin caused no injury in rats or dogs receiving 40 exposures, each of 30 minutes' duration, within 27 calendar days.

Single 30-minute exposures of rats to concentrations of aerosols of commercial allethrin and pyrethrins on the order of 350 times the level used for the repeated exposures caused no visible damage, nor did they depress weight gained during a subsequent 14-day observation period.

A fog of commercial allethrin was lethal to one of 10 rats in a two-hour exposure at a concentration of 19 mg./L., and only four of 10 succumbed in a four-hour exposure to 13.8mg./L. These massive concentrations of allethrin are respectively 10,000 and 7,000 times the amounts that would be present in the aerosols utilized in freeing aircraft from insects. The extreme viscosity of an 84 per cent pyrethrin concen-

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trate and its unavailability made comparisons impossible.

The single dose acute oral LD_{50}'s of commercial allethrin for rodents fed 20 per cent dilutions in deodorized kerosene are as follows: mice 0.48, rats 0.92 and rabbits 4.29 Gm./Kg. Two different samples of purified pyrethrins, 20 per cent in petroleum distillate,, gave LD_{50} values of 0.82 and 1.87 Gm./Kg. for rats.

The LD_{50} of undiluted commercial allethrin for rabbits by the percutaneous route is 11.2 ml/Kg. Dilution i n deodorized kerosene markedly increases toxicity by skin penetration, but dimethyl phthalate appears not to aid penetration.

Undiluted commercial allethrin and dilutions in deodorized kerosene are harmless to rabbit eyes, but they cause moderate erythema of the clipped skin of the rabbit belly when applied in single or repeated applications. Drill cloth impregnated with this allethrin at the rate of 4 Gm. per square foot caused marked erythema of the hair-free trunk of rabbits when worn for three days. Subsequently these reactions subsided even though the impregnated bands were reapplied twice each week during a 21-day period of wear. No systemic injury, as judged by weight changes, resulted, and all skin reaction had subsided in this interval.

Guinea pigs could not be sensitized by a course of eight intracutaneous injections of a 0.1 per cent dispersion of allethrin in 3.3 per cent propylene glycol in isotomic sodium chloride solution followed by a 21-day incubation period before retest.

The evidence presented above indicates that commercial allethrin is of the same relative order of toxicity as pyrethrins. On the basis of this comparison we conclude that it may be used safely as an insecticide in syrays and aerosols.—Summary of "Comparative Acute and Subacute Toxicities of Allethrin and Pyrethrins," by C. P. Carpenter, C. S. Weil, U. C. Pozzani and H. F. Smith, Jr., in *Archives of Industrial Hygiene and Occupational Medicine*.

DDT for Corn Earworm

The introduction of DDT has simplified control of corn earworm in New York State, according to entomologists at the Experiment Station at Geneva. Formerly, control depended largely upon the use of mineral oil applied in small doses to the silk channels as the young worms hatched out. This was a laborious and time-consuming operation, as well as an expensive one.

Recent experiments have demonstrated that effective control of the earworm may be obtained with a DDT dust applied when 50 per cent of the silks have appeared, with three or four more applications made at two to three-day intervals. The chief objective of the treatment is to keep the silks reasonably well covered with the dust during the period of egg laying and hatching, the Station workers say. Tractor-drawn row-crop dusting equipment with wide axle clearance for applying dust to sweet corn is now in use and greatly facilitates dusting for earworm control.

Various formulations of D DT dust have been tried out in the experiments, but a five per cent D DT dust used at the rate of 50 pounds to the acre for each treatment has been found to give the best control. A one per cent parathion dust combined with a five per cent DDD dust also gave good control.

Chemical tests made on ears from treated plots at harvest time revealed some insecticide residue present on the husks. Husked ears, however, showed only negligible reaidues of DDT and none of parathion. —New York Agricultural Experiment Station Progress Report No. 7783.

•

Study Distribution of HCN

Field fumigations of citrus trees for control of the California red scale (*Aonidiella aurantii* (Mask.) were made to determine whether more uniform distribution of hydrocyanic acid could be obtained by improving the standard vaporizers or their operation, or by developing an improved applicator. With the standard vaporizers the gas concentration was low on the side of the tree on which it was released and high on the opposite side, and was more variable when the foliage was dense than when it was thin.

Distribution of hydrocyanic acid with the vaporizer was improved (1) when half the gas was released from one side and half from the opposite side under the trees, (2) when a baffle was placed on the standard vaporizer nozzle to change the direction of the stream of hydrocyanic acid during part of the release period, and (3) when outlets 2 feet apart were provided on the vaporizer nozzle. A propeller-blower applicator gave much better distribution of hydrocyanic acid than a standard vaporizer.

Unfortunately, improved distribution of hydrocyanic acid did not result in improved kills of the California red scale under conditions of commercial operation, and the baffle nozzle and blower applicator were found to have serious operational disadvantages.

—Summary of "Studies on Improving the Distribution of Hydrocyanic Acid in Citrus Fumigation," by Harold R. Yust, Div. of Fruit Insect Investigations, U. S. Department of Agriculture. U.S.D. A. Bulletin E-822, August, 1951.

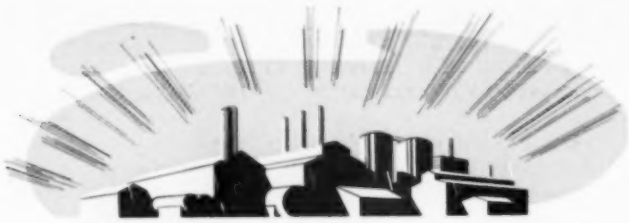
•

Insecticide-Seed Mixture

To control insects such as wireworm and seedcorn maggot which feed on planted seed and developing seedlings, more and more attention is being paid to the use of insecticides in seed treatment chemicals. The two pests mentioned, feed especially on lima and other types of beans while wireworms are a problem with many crops, including sugar beets, milo, wheat, barley, cotton and truck crops.

Up to now the only recommended control for seed-corn maggot has been to plant the crop when the insects were least menacing—usually only a 4-day period in the East. Many controls have been tried for wireworms, but some are costly,

(*Turn to page* 101)



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INDUSTRY NEWS

Diamond Acquires Kolker

Diamond Alkali Company, Cleveland, producers of basic chemicals, and Kolker Chemical Works, Inc., Newark, New Jersey, have announced that arrangements have been made for Diamond to obtain all the common capital stock of Kolker in exchange for 33,500 shares of Diamond's common stock, subject to approval by Diamond shareholders at a special meeting which was scheduled for August 30, 1951. In making this announcement, Diamond's president Raymond F. Evans stated that if the acquisition was made, no change in Kolker's management is contemplated.

Diamond operates 12 plants throughout the country and its present annual sales are at the rate of $75,000,000. Kolker, with plants at Newark, N. J., and Houston, Tex., manufactures a line of organic insecticides and other agricultural chemicals, with sales presently at the rate of $7,000,000 per year.

The acquisition of Kolker, Mr. Evans pointed out, would diversify Diamond's present line of over 100 chemicals in a logical direction. Kolker produces DDT, BHC, 2,4-D, and 2,4,5-T.

•

Shell Appoints Two Mgrs.

J. J. Lawler, manager of Shell Chemical Corporation's St. Louis district office, has been appointed manager of the Chicago district office, the company has announced. At the same time, James K. Robbins, Jr., was appointed manager of the St. Louis district office.

Mr. Lawler, graduate of the University of Missouri in 1937, has been engaged in administrative and sales capacities with Shell for 14 years.

Mr. Robbins, a native of Missouri, attended St. Louis and Chicago Universities and has been engaged in chemical sales for more than 15 years.

H. L. Comin Joins CSC

Harvel L. Comin, Jr. recently joined the sales force of Commercial Solvents Corp., New York, according

H. L. COMIN, JR.

to a company announcement. Mr. Comin will handle feed product sales under the general supervision of Dr. James Brooks, and will be located in Terre Haute, Ind.

•

Barrett Lab. Expansion

Barrett Division, Allied Chemical & Dye Corp. has contracted for the erection of a new research laboratory at Edgewater, N. J., it has been announced. Total cost of the project is about $500,000. and the work is expected to be completed by the first of the year.

The expansion program will accomodate research on fertilizers as well as on a number of industrial chemicals. The new building will be connected to the firm's existing structures on the site.

•

NFA Plans Atlanta Meeting

Program details were well under way at press time for the annual fall meeing of the National Fertilizer Association to be held at the Atlanta Biltmore hotel, Atlanta, Ga., November 12, 13 & 14.

The program of Tuesday, Nov. 13 is to be devoted entirely to general discussions by representatives of government agencies having to do with supplies and price control. Speakers are expected to be from the Office of Price Stabilization; the National Production Authority; Atomic Energy Commission and the U. S. Department of Agriculture. Talks will also be heard from Dr. Russell Coleman, NFA president and by J. E. Totman, Summers Fertilizer Works, Baltimore, Md., chairman of the board.

Also on the agenda for discussion, probably in the form of a symposium, will be the subject of fertilizer safety.

•

Telford New Dept. Head

Dr. H. S. Telford has been named chairman of the department of entomology at Washington State College, Pullman, Washington, to succeed Dr. R. L. Webster whose retirement became effective in July, after 25 years of service to the state. Dr. Telford also holds the position of professor of entomology in the Department of Zoology and Entomology for the Agricultural Experiment Station.

Dr. Harold G. Simkover, a graduate of Wiscon University, has been appointed junior entomologist at the Agricultural Experiment Station. He will be stationed at Pullman, working principally with radioactive tracers.

•

Program to Come, NY Meet

Program plans were not complete at press time, for the thirteenth annual New York State Inecticide and Fungicide Conference and the third annual Pesticide Application Equipment Conference to be held at Ithaca, N. Y. November 7-9, but the committee expected to announce the names of speakers shortly.

The meetings will be held at Bibbins Hall, G L F, Terrace Hill, Ithaca, according to Dr. Charles E. Palm, head of the Department of Entomology, Cornell University, Ithaca.

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Big Sulfur Deposit Found in Louisiana

THE biggest sulfur deposit discovery in 20 years has been made in Louisiana by Freeport Sulphur Co., it has been announced. The deposit, located at the mouth of the Mississippi river, about 100 miles southeast of New Orleans, is expected to produce as much as 500,000 long tons a year when in full operation. Freeport officials stated that the mine should be in operation by 1953.

Discovery of the sulfur was made on a 100,000 acre site leased from the Texas Co., and is the result of many years of searching in the general region.

Spokesmen for the Bureau of Mines, Department of the Interior, said that this new discovery promises sufficient production to solve the free world shortage of sulfur.

Freeport will seek a certificate of necessity to speed its output of sulfur, it is reported.

•

Marshutz Heads Committee

Howard Marshutz, manager of Waterproof Sales, Bemis Bros. Bag Co., St. Louis, has been appointed chairman of the Committee on Waterproof Paper Lined Bag Specifications of the Textile Bag Manufacturers Association. This committee is set up by the association to investigate new markets for bags made of cotton or burlap laminated with paper or other lining materials.

•

L. J. Even Joins Fulton Bag

Fulton Bag & Cotton Mills have announced the addition of Louis J. Even to its New Orleans sales staff. Mr. Even is a native of New Orleans and has been connected with the bag industry for many years. He has served with several different companies and for the last thirteen years was with Bannon Bag Company, until its recent withdrawal from the industry.

•

To Present Safety Award

Establishment of the Lammot du Pont Safety Awards to be presented annually by the Manufacturing Chemists' Association to two member companies showing the greatest improvement in plant safety over the preceding five years has been announced by Charles S. Munson, chairman of the Association.

Initial presentation of the Awards will be made at the Association's annual meeting next June.

Consisting of inscribed bronze placques, the awards are financed by a cash gift to MCA from Lammot du Pont, former chairman of the board of E. I. du Pont de Nemours & Company and a former chairman of the Association. In presenting the gift Mr. du Pont stipulated that it be used "for the purpose of increasing the interest in industrial accident prevention and improving the safety records of member companies."

•

100 at Maine Conference

Presque Isle, Maine, was the locale of the Maine Fertilizer Conference on August 9 & 10, attended by a hundred persons representing fertilizer manufacturers, educators and state and federal government agencies. The program included the presentation of technical papers among which were: "Fertilizing Potatoes in 1952," by Dr. G. I. Terman, Maine Agricultural Experiment Station; "Culture of Small Fruits in Aroostook County," by Dr. F. P. Eggert, Maine Ag. Exper. Station; "Crops for Freezing in Aroostook," by Joseph P. King, Birds Eye Division, General Foods Corp., Rochester, N. Y.; "Soil Fertility Trends," by Oscar L. Wyman, University of Maine; and "Two Acre Club," by Charles H. Moran, Maine Agri. Exper. Station.

A field trip in the area illustrated the diversificaton of crops now taking place in Aroostook County where hundreds of acres of broccoli, peas and strawberries are being grown in addition to small grain crops.

Ralph E. Fraser, Summers Fertilizer Co. presided at the annual dinner held at the North Eastland Hotel and Frank Lovejoy, Socony Vacuum Oil Co., New York, presented an after-dinner talk, "It's Later Than You Think." The new color motion picture, "Deeper Acres," produced by the National Fertilizer Association, was shown at the Maine meeting.

•

Ohio Pesticide Tour

A good-sized crowd attended the annual tour of the Ohio Pesticide Institute August 7 and 8. Dr. H. C. Young, Wooster, O., was chairman of the tour which included the inspection of pesticides on tomatoes, potatoes, apples and other vegetables.

Visiting various projects at the Ohio Agricultural Experiment

AS WE GO TO PRESS . . .

Station at Wooster and extending their inspection to different farms in the area, the group heard talks on control of insects and diseases. W. E. Krauss, associate director of the station gave the address of welcome and Ralph Neiswander described mite control on dahlias.

J. D. Wilson and Jay Sleesman talked on concentrates on vegetables, tomatoes and cucumbers; while Dr. Wilson and Al Suhovecy discussed copper-oil sprays. Soil additives were discussed by Dr. Wilson and Jack Miller.

The second day of the tour found the group at the botany and entomology orchard where Frank Winter discussed apple scab control; C. F. Cutright, "Mite Control on Apples," and also discussed an experiment on horticultural orchards. The state muck farm was visited at Willard, and Drs. Wilson and Sleesman told the group about experiments with disease and insect control on onions, carrots, celery, potatoes and soil treatments on several other vegetables.

Officers of the Ohio Pesticide Institute are: Harold Bruner, president; Sam Jeffrey, 1st vice-president; Dan Kent, 2nd vice-president; H. C. Young, secretary; and R. O. Cowin, treasurer.

•

Pierce Joins Hercules

Henry F. Pierce has joined Hercules Powder Co., Wilmington, Del., as an entomologist, the company has announced. The new appointee, a graduate of both Penn State and Rutgers University, served in the Naval Medical Service Corps. He was formerly assistant entomologist with Merck & Co., Rahway, N. J., and came to Hercules from the Standard Oil Development Co. of Linden, N. J. where he was engaged in research and development work.

•

Kulow, Robinson Named

W. R. Kulow has been named assistant divisional sales manager, Phosphates Division of the Westvaco Chemical Division, Food Machinery and Chemical Corporation, New York. Mr. Kulow was, until recently, associated with the Monsanto Chemical Company and previously a member of the New York sales division of Stauffer Chemical Company.

The company has also announced the appointment of H. D. Robinson as assistant divisional sales manager, Alkali Division, also with headquarters at New York.

•

Gidney New Potash S.M.

J. E. Burns, vice president in charge of sales of the United States

DEAN R. GIDNEY

Potash Company, is retiring from the position as of September 1st, for reason of health. He will remain with the company as a consultant.

Active direction of the sales department will be in the hands of Dean R. Gidney who has been in the sales department since 1938 and sales manager since 1950. Mr. Gidney was graduated in 1936 from Dartmouth College where he was elected to Phi Beta Kappa. He was employed by the United States Trust Company for one year and joined U. S. Potash Company in 1937. Mr. Gidney became an Ensign in the United States Navy early in 1941 and served in the North and South Atlantic and for two years in Europe with the Landing Craft Staff preparatory to and following the invasion. He was returned to inactive duty as a Lieutenant Commander in 1946 and rejoined the United States Potash Company. Mr. Gidney was appointed assistant sales manager in 1948 and sales manager in 1950.

Mr. Barnes has been with the United States Potash Company since 1940. Prior to that time he had been with F. S. Royster Guano Company. He joined the company as manager of the Atlanta, Georgia, sales office. He was appointed sales manager and moved to the New York office in 1943. In April, 1947 he was elected vice-president in charge of sales, succeeding the late J. C. Devilbiss.

Potash Deliveries Up

Potash deliveries during the second quarter of 1951 in North America by the five major American potash producers and also importers registered a new high, totaling 863,784 tons of potash salts containing an equivalent of 490,604 tons K_2O, American Potash Institute has announced. It represented an increase of 25% in salts and K_2O over the tonnage delivered during the corresponding period in 1950. Imports comprised 158,217 tons K_2O in the above and include those during the entire first half of 1951. Deliveries for agricultural purposes in the United States, Canada, Cuba, Hawaii, and Puerto Rico (Institute countries) amounted to 816,628 tons of salts equivalent to 461,436 tons of K_2O, consisting of 419,843 tons of muriate, 1,570 tons of manure salts, and 40,043 tons of sulphite of potash and sulphate of potash-magnesia. Deliveries for chemical purposes amounted to 39,636 tons of salts, equivalent to 24,570 tons of K_2O. Exports to other than Institute countries totaled 4,578 tons K_2O.

During the first six months of 1951, total North American deliveries including imports amounted to 1,490,075 tons of salts containing an equivalent of 849,054 tons K_2O. This represented an increase of 34% in salts and K_2O over the same period in 1950.

•

Mixtures Get Poor Results

Florida Agricultural Experiment Station, Gainesville, Fla. reports that results of experiments to determine effects of mixing insecticides with fertilizers were somewhat negative. None of the mixtures caused any observable effects on plants growing in the test plots. Taste tests of beans indicated, however, a definite off flavor from BHC and a slight off-flavor from lindane. Flavor of tomatoes was not affected.

Other tests were made to determine what effect heavy concentrations of insecticides in the soil might have on germination of vegetable seeds and seedling plants. Seven insecticides were used at three levels of concentration, 1, 5 and 10 lbs. of active ingredient per acre. Fertilizer was added at a uniform rate. Seeds of six vegetables were used.

"Seed germination," says the report, "apparently was not affected by addition of these concentrations of insecticides to the soil. All concentrations of BHC showed evidence of delaying and retarding growth of seedling tomatoes and pepper plants. This stunting was in direct proportion to the concentration and the highest concentration very markedly halted development of the plants over a long period." Examination of root systems indicated that development of primary and secondary roots was inhibited and the roots terminated abruptly and had thickened, blunt ends, the report stated.

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Ky. Fertilizer Meeting

The Department of Agronomy of the University of Kentucky, Lexington, was host on August 8, to 75 representatives of the fertilizer industry. The group viewed field work on the Experiment Station farm, with burley tobacco in relation to fertilizer treatment, crop rotation and disease control. Further attention was given to a list of ratios and minimum grades to be used in making fertilizer recommendations for field crops in Kentucky.

A chart listing recommendations soon to be published by the University of Kentucky, is as follows, according to P. E. Karraker, in charge of the soil section.

Ratios	*Minimum Grades*
0-2-1	0-14- 7
0-1-1	0-12-12
0-1-2	0-10-20
1-4-2	4-16- 8
1-3-2	4-12- 8
1-4-4	3-12-12
1-1-1	8- 8- 8
1-2-2	5-10-10
1-2-3	4- 8-12

N. J. Fertilizer Conference

According to Stacy B. Randle, Rutgers University, the New Jersey Fertilizer Conference will be held September 27 in Lipman Hall, New Brunswick, N. J. Included in the program are two papers, "Physical and Chemical Problems in Mixed Fertilizer Production," by Joseph A. Chucka; and "The Superphosphates Outlook for 1952 ," by Dr. Russell Coleman, president of the National Fertilizer Association, Washington, D. C.

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Cotton Insect Conf. Coming

The date for the Cotton Insect Control Conference is not set as yet, according to Claude L. Welch, National Cotton Council, Memphis, Tenn. However, the meeting is expected to be held sometime during the week of December 2, he said.

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New Application Method

Mississippi Agricultural Experiment Station, State College, Miss., has developed a hill drop planter for planting cotton, with an attachment for applying pre-emergence weed-killing chemicals, in one operation. Experimental data had indicated that hill drop planted cotton is superior to drill planted when used with pre-emergence sprays. International Harvester Co., provided a Cub tractor with tanks and mountings, but as they had not yet developed a hill drop planter to go with the tractor, the station engineers designed and built one with spray boom, nozzles, valves, shoes, etc., added.

"Development of the planter," says the station report for fiscal 1950, "has promoted use of dinitros for pre-emergence because rates of three and four pounds per acre can be used on the band over the row and still get a good stand of cotton. On drill cotton it has been almost impossible to use above two pounds per acre. The higher rate gives a much better and longer control of weeds and grasses in the row."

Since 1947, when anhydrous

ammonia was first used in Mississippi, farmers of that state have fertilized nearly 3,000,000 acres with this new source of nitrogen, the station reports. Last year about one-half the nitrogen element used in Mississippi was in this form. Use has extended from the Delta section, where it started, into the state's hill area where ten new bulk stations were erected last year to provide quickly available supplies.

"Anhydrous ammonia," the report adds, "has continued to be slightly superior to ammonium nitrate for cotton production, when applied before planting. When used as a side dressing, anhydrous ammonia was more effective than ammonium nitrate when applied four inches deep." These findings are discussed in a new bulletin No. 152, entitled "An Economic Appraisal of Anhydrous Ammonia as a Nitrogenous Fertilizer," which was issued by the Mississippi station during 1950.

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Freeport to New Bldg.

Freeport Sulphur Company, New York, has rented the entire 8th floor of the Chrysler Building East on a long term lease, it has been announced.

The new 32-story air-conditioned Chrysler Building East, companion structure to the original 77-story Chrysler Building, is scheduled for completion in November, 1951.

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New Calif. Velsicol Office

The establishment of a West Coast office for insecticide sales and service at 2082 Center St., Berkeley, Calif., was announced recently by Velsicol Corp., Chicago. George Weldon and Dr. Donald G. Denning, West Coast sales director and field entomologist, respectively, are making their headquarters at the new office. Warehouse facilities and chlordane stocks are being maintained at Los Angeles and San Francisco on a year 'round basis. The telephone number of the Berkeley office is Thornwall 3-5652.

Maxwell Joins Agriform

Kenneth E. Maxwell has recently been appointed manager of the insecticide department at Agriform Co., Santa Ana, Calif., manufacturers and distributors of agricultural chemicals. Prior to his appointment, he was an independent consultant, and formerly, a staff member of the Citrus Experiment Station of the University of California.

More Books

Insect Control by Chemicals by A. W. A. Brown. Published by John Wiley & Sons, Inc., New York. 6 x 9 inches, 817 pages, cloth binding, price $12.50. Household and agricultural insects and their control are considered in this text, which discusses the various phases of insect control in eleven main sections: "Insecticides of the Mid-Twentieth Century and Their Properties;" "The Structure of Organic Chemicals and Their Toxicity to Insects;" "Susceptibility of Insects to the Entry of Poisons;" "The Pharmacology of Poisons for Insects;" "Equipment Developed for the Application of Insecticides;" "Application of Insecticides from Aircraft;" "Toxicity and Hazards to Man and Domestic Animals;" "Toxicity of Insecticides to Plant Growth;" "Chemical Control of Insects Feeding on Plants;" and "Chemical Control of Insects Affecting Man and Animals."

In discussing the various insecticides, the author presents essential facts and theories on the chemical, physical and toxicological aspects of the compounds, and indicates the best insecticides to employ against particular economic insects which attack plants, animals and man. For example, the dangers of calcium arsenate dust for boll-weevil control on cotton are discussed, the use of insoluble basic copper arsenate suggested an alternative measure in treating cotton on sandy soils. Sprays containing thiocyanates or pyrethrins are said to be effective in controlling cockroaches, while DDT or BHC is suggested for control of fleas.

Each of the main sections is followed by an extensive bibliography, so that a total of about 2300 references are included in the text.

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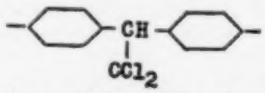
The 1951 edition of the *Chemical Age Year Book*, published by Benn Bros. Ltd. London, England, includes an article on the toxic factor in DDT. The article points out that several investigations of factors to which DDT may owe its toxicity have been carried out, presenting several theories correlating molecular structure with insecticidal activity. One such theory deduces that the molecular group common to both DDT and methoxychlor should be the one imparting toxicity, since DDT resistant strains of flies are also resistant to methoxychlor. The highest common factor of these two compounds is:



and it is to this group, its toxic action augmented by the lipoid solubility due to the p-chlorphenyl groups, that one must look for the toxic factor of DDT.

Still other articles in this text discuss the "Transport Factors in the Chemical Industry," "Weed Control on the Railways," "Statutory Safeguards in Chemical Processes;" and "Atomic Power Prospects."

•

C. B. Williams and B. P. Singh, experimenting at Rothhamsted Experiment Station in Great Britain, have found that at the time of full moon, nocturnal insects are only about a fifth as plentiful as during the dark of the new moon.

Last summer and fall, entomologists Williams and Singh made a test by sucking up insects at night with a strong electric fan, so that the light trap which they used would not affect catches.

Catch in the new moon week was five times that in the full moon week. These entomologists plan to repeat their experiments again this year according to a story in a recent issue of *Nature*.

"Dethmor" in Wide Use

S. B. Penick & Co., New York, report that their warfarin rodenticide product, "Dethmor" is increasing in use both in the United States and abroad. Crops being protected from rat infestations include corn, rice, sugarcane, coffee, wheat and cotton. In Hawaii, particularly, sugarcane protection is a continuous operation and the warfarin product has proved successful, it is reported. The situation is said to be such that rat control often represents the difference between a profitable and non-profitable year.

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New Lab. for Pittsburgh

Pittsburgh Coke & Chemical Company has announced completion of the first major unit of its new central research laboratories at Neville Island near Pittsburgh, Pa. The new unit more than doubles the company's available laboratory space and centralizes a number of research groups previously located at different points.

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CFA Meeting Plans

The California Fertilizer Association will hold its 28th annual convention at Hotel Californian, Fresno, November 1-3, according to Sidney H. Bierly, executive secretary and manager. The morning of the first day will be devoted to registration for delegates and their wives and a speaking program. Included on the agenda for the initial day are Dr. Arnold E. Joyal, president, Fresno State College, "The New Agricultural Look of Fresno State College;" Dr. Russell Coleman, president, The National Fertilizer Association, Washington, D. C., "Break the Bank." James M. Quinn, president of the California Fertilizer Association, Los Angeles who will outline the activities of the CFA, and Mr. Bierly will present his report. Industry leaders will also appear on the program to discuss the fertilizer supply situation. That evening, the NFA color and sound movie, "Deeper Acres" will be shown.

Harold R. Krueger, Phillips Chemical Co., Bartlesville, Okla., will be the featured speaker on the program of November 2. Mr. Krueger will outline the fertilizer section of the National Safety Council, (Scheduled to be organized in Chicago on October 11).

The California State Bureau of Chemistry will have a prominent part on the program of Nov. 2. Allen B. Lemmon, chief of the State Bureau of Chemistry will be in charge of this portion of the day's activities. The afternoon session will be in charge of the Association's Soil Improvement Committee, of which M. E. McCollan, American Potash Institute, is chairman. The annual CFA banquet will be held Friday evening, featuring Hollywood entertainment and a floor show, Mr. Bierly states.

Entertainment is planned for the ladies, with numerous prizes being offered. Golf, bowling and bridge are available to all attending the convention. Dr. Wallace Macfarlane, Pacific Guano Co., Los Angeles, is chairman of the program committee.

MEETINGS

Annual Fertilizer Conference. Rutgers University. New Brunswick, N. J., September 27, 1951.

California Fertilizer Association. Hotel Californian, Fresno, Calif., November 1-3.

13th Annual New York State Insecticide and Fungicide Conference, and third annual Pesticide Application Equipment Conference. Ithaca, N. Y., Nov. 7-9.

Cotton Mechanization Conference. Cotton Branch Experiment Station. Chickasha, Oklahoma. Nov. 8 & 9.

National Fertilizer Association Fall Meeting. Atlanta Biltmore Hotel. Atlanta, Ga., November 12-14.

Eastern Branch, AAEE. New Yorker Hotel, New York, Nov. 15 & 16.

Combined meetings of American Association of Economic Entomologists: Entomological Society of America: American Phytopathological Society; and the Potato Association, Netherland Plaza Hotel, Cincinnati, Ohio, December 9-13.

North Central Weed Control Conference. Biltmore Hotel, Oklahoma City, Okla., December 11, 12 and 13.

Northeastern States Weed Control Conference. New Yorker Hotel, New York City, Jan. 2, 3 & 4, 1952.

11th Annual Meeting, Northwest Vegetable Insect Conference. Imperial Hotel, Portland, Oregon, January 21-23, 1952 (David H. Brannon, Pullman, Washington, Secty.)

To Build Allethrin Plant

Construction of a five to six million dollar plant to produce allethrin, has been announced by Dr. J. G.. Davidson, President of Carbide and Carbon Chemicals Company, a Division of Union Carbide and Carbon Corporation. This new plant will be built at Institute, West Virginia where Carbide already manufactures most of the raw materials required for allethrin production. Economies of large scale production in the new plant will make substantially lower costs of allethrin posible.

With pyrethrum, imported chiefly from Africa, being stockpiled for emergency military use, a certificate of necessity for the new plant was recently issued by the Defense Production Administration. The manufacture of allethrin here assures the United States of an adequate domestic source of this insecticide at a cost lower than that of pyrethrins.

Economies resulting from the large scale production in the new plant are expected to offer encouragement to expand present uses and to develop new applications. New synergists for allethrin are already in sight, and research will be intensified now that there is assurance of an adequate supply.

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To New Association Post

H. L. Thomasson, president-elect of the International Association of Milk and Food Sanitarians, Inc., has been appointed by the executive board to the full time position of executive secretary of the Association and business manager of the *Journal of Milk and Food Technology*. Mr. Thomasson has had wide experience in the publishing field and in business management.

The line-up...

...of the nation's No. 1 crop enemies!

A gruesome group, isn't it!

They'll stop at nothing from picking your pocket to murder.

These hoods are all hardened criminals with records on county agents' "blotters" from coast-to-coast. They've been victimizing the farmers for years and their take runs into millions of dollars.

Now, after years of investigation and research, Geigy's G-men have uncovered the evidence that will put these criminals where they belong — in the hot seat.

Here are the "goods" you need to prosecute the bugland syndicate to the fullest:

Aldrin	Fumigants	Pyrethrum
Arsenicals	Dieldrin	Rotenone
BHC	Lindane	Sulphur
Carbamates	Methoxychlor	Tepp
Chlordane	Parathion	Toxaphene
Copper	PCP	2, 4-D
DDT	Purified DDT	2, 4, 5-T

Do your part. Act now!

ORIGINATORS OF Geigy DDT INSECTICIDES

GEIGY COMPANY, INC. **89 BARCLAY ST., N. Y. 8, N. Y.**

Aberdeen, N. C.; Burlington, Iowa; Colorado Springs, Colo.; Elkton, Md.; Fresno, Calif.; Houlton, Me.; Leland, Miss.; McGregor, Tex.; Orlando, Fla.; Walla Walla, Wash.

Dealer & Distributor Inquiries Invited

Pesticide Supplies Listed

According to the June-July issue of the "*News*" published by the National Agricultural Chemicals Association, Washington, D. C. the supply of pesticides is "tight to short, generally" for all materials depending on chlorine, alcohol and benzol. The list, as published by the NACA is as follows:

DDT. Tight. Expected to remain so.

DDD (TDE). Short. Expected to remain short.

BHC. Adequate to tight. Future supply dependent on exports and demand for cotton pests.

Toxaphene. Short. Future supply dependent on available supply of chlorine.

Chlordane. Tight. Expected to remain so through August.

Aldrin. Adequate. Expected to become tight.

Dieldrin. Short. Expected to remain so.

Lead. Adequate.

Calcium. Adequate. Expected to remain adequate.

Cryolite. Ample.

Parathion. Adequate.

TEPP. Ample. Expected to remain so.

Pyrethrum. *Short*. Expected to remain short.

Copper Sulphate. Tight but easing.

Fixed Coppers. Adequate. Seasonal peak of demand about over.

Dinitros. Tight. Expected to remain so.

Carbamates. Ample. Expected to remain ample.

2,4-D & 2,4,5-T. Short. Expected to remain so.

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Amer. Potash Names Two

Appointment of two new assistant vice-presidents as part of its expansion program was recently announced by American Potash & Chemical Corporation.

Parker Dunn, 42, who resigned as resident manager for the Potash Company of America at Carlsbad, N. M. to acept the new post, will report to the vice-president in charge of technical operations. Mr. Dunn will be concerned with plant operations.

Above: Air view of Sterlington, Louisiana, plant of Commercial Solvents Corporation, for the expansion of which the company has received a Federal Certificate of Necessity. The first unit to the left of the gas holders, is for anhydrous ammonia. The one below that is the methanol unit. Foundations for two additional units are visible in the foreground.

Thomas F. Edson, 45, whose last position was executive assistant for Victor Chemical Works at Chicago, will report to the vice-president in charge of research and development.

The men have had extensive and diversified experience in chemical manufacturing. Before joining the New Mexican company ten years ago, Mr. Dunn served with Southern Alkali, Corpus Christi, Tex., Pittsburgh Plate Glass Company, and Mead Corporation. He is a graduate of Ohio State University and received his Master's degree from Massachusetts Institute of Technology.

Edson was with A. R. Maas Chemical Company for 15 years, advancing from plant engineer to executive vice-president. When Mass merged with Victor he was made executive assistant at the Victor works. His earlier background includes three years at the American Potash & Chemical Corporation plant at Trona, as well as service with Firestone Tire & Rubber Company and Union Oil Company. He is a graduate of the California Institute of Technology.

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Fertilizer Plant Burns

The Staunton, Va. plant of the Cold Springs Mining Co., Elizabeth, N. J., was damaged severely by fire recently. The plant, located at Staunton, processed kaolin.

New Cyanamid Appts.

American Cyanamid Company has announced the assignment of three of its executives to management functions of the Arizona Chemical Company. They are: Dr. R. C. Swain, Cyanamid's vice-president in charge of research who will supervise Arizona's research and process development; E. D. Powers, vice-president in charge of production, to supervise all of Arizona's manufacturing activities, and Dr. D. H. W. Felch, chief engineer, to direct engineering activities of the Arizona Company. The three men will retain their Cyanamid posts.

The Arizona Chemical Company, owned jointly by Cyanamid and the International Paper Company, converts by-products of International's Southern Kraft Division into industrial chemicals.

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Grain Storage Treatments

The August, 1951, issue of *Unico Preview* contains recommendations for treating grain for storage. Published by the United Co-operatives, Alliance, Ohio, the recommendations appear in the farm chemical section. The recommendations include (1) raising good clean grain, (2) cleaning and spraying storage space with DDT or pyrethrum, (3) treating grain, if clean or slightly infested, with a protectant and (4) treating heavily infested grain with a grain fumigant.

IMPORTANT ANGLE ON FARM PROFITS

The modern farmer relies a lot on plain old-fashioned sunshine to help tiny seeds and tender sprouts grow into bumper crops. But he knows he can't rely on sunshine *alone*.

Fortunately, there are many resources besides sunshine to help the farmer. In fair weather or foul, he can do much to improve the quality of his soil—and the size of his harvest —through the wise use of the right fertilizers.

Many of the most effective fertilizers are those compounded with potash—often with Sunshine State Potash, a product of New Mexico, and a soil nutrient which not only provides increased soil fertility, but also gives greater resistance to disease and drought.

Reg. U. S. Pat. Off.
HIGRADE MURIATE OF POTASH
62/63% K_2O
GRANULAR MURIATE OF POTASH
48/52% K_2O MIN.
MANURE SALTS 20% K_2O MIN.

UNITED STATES POTASH COMPANY, *Incorporated*, 30 Rockefeller Plaza, New York 20, N. Y.

Pesticide Committee in D. C. Meeting

THAT the general pesticide industry could operate "reasonably satisfactorily" under the Manufacturers' General Ceiling Price Regulation, CPR 22, to become effective October 1, was reported by members of the Agricultural Pesticides Industry Advisory Committee at their first meeting with OPS officials on August 3.

Of 13 committeemen present, eight reported CPR 22 would give them general price increases above ceilings under the General Ceiling Price Regulation (GCPR), and five suggested no change or mixed rollbacks and rollforwards. None reported that rollbacks were predominant. However, several said that they could not take general advantage of higher ceilings because of competitive conditions while they would still have to take their rollbacks under price control.

It was suggested that employment of the device provided in SR 2 to CPR 22, under which overall cost increase factors are applied uniformly to GCPR prices instead of to base period prices, might tend to equalize rollbacks and rollforwards.

Committeemen expressed apprehension over the possible effect of future increases in prices on their basic raw materials, and suggested that the possibility of writing a tailored regulation for their industry covering such contingencies, be explored.

It was suggested that another meeting be held around November 1 after the industry has completed filing forms 8 under CPR 22, to determine whether a tailored regulation might be desirable for the industry and what form it would take. OPS officials reported that few Forms 8 had been received from the industry up to the time its operation was suspended by SR 12 to CPR 22, and urged members to file before October 1.

Members stressed the desirability of having prices in the industry stabilized around October for the coming season. Committeemen also urged the need of a device for more rapid pricing of new formulations. Under CPR 22 a waiting time of 15 days after filing proposed ceilings on new products is required.

The meeting was conducted by Hugh E. Weisberger, division economist, Rubber, Chemicals and Drugs Division. Other OPS officials present were: Henry A. Huschke, head, Agricultural Chemicals Section; Howard J. Grady and Susan M. Phillips of the section staff; Philip Travis, counsel, and Wilhelm Hirachkind, technical adviser, Chemical Branch; Manual B. Hiller, counsel; Sam Tannanbaum, Office of Enforcement, and Harry Spack, Office of Advisory Committees.

H. H. Shepard, Department of Agriculture, Office of Materials and Facilities, and B. T. Wren, Office of Civilian Requirements, N. P. A. also attended.

Members of the committee are:

J. Hallam Boyd, executive vice-president Commercial Chemical Company, Memphis, Tennessee: B. P. Webster, vice-president, Chipman Chemical Company, Bound Brook, New Jersey: J. V. Vernon, vice-president, Niagara Chemical Division, Food Machinery Corp., Middleport, New York: John A. Rodda, Insecticide Division, U. S. Industrial Chemicals, Inc., New York 17, New York; W. Mercer Rowe, Jr., vice-president, Flag Sulphur & Chemical Company, Tampa, Florida: Paul Mayfield, ass't. general manager, Naval Stores Department, Hercules Powder Company, Inc., Wilmington, Delaware: W. C. Bennett, president, Phelps - Dodge Refining Corp., New York; H. J. Langhorst, manager, Insecticide Department, American Cyanamid Company, New York: W. W. Allen, Manager, Agricultural Chemicals Sales, The Dow Chemical Company, Midland, Michigan; E. F. Stayner, Ass't. Manager, Agricultural Products Department, Shell Chemical Corp., New York: W. J. Haude, President, Pittsburgh Agricultural Chemical Co., New York; Carlos Kampmeier, Manager, Agriculture Sales, Rohm & Haas Company, Philadelphia, Pennsylvania: Mr. Joseph Regenstein, Jr., President, Velsicol Corp., Chicago 11, Illinois; George F. Leonard, Executive vice-pres., Tobacco By-Products & Chemical Corp., Richmond, Virginia; and John Stoddard, sales manager, John Powell & Company, Inc., New York.

All committeemen were present except Vernon and Bennett.

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Insecticide Firm Expands

Agricultural Chemicals, Inc. Llano, Texas, manufacturers of insecticides, recently purchased land and buildings at Jacksonville, Fla. as a site for a new plant.

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New N Production Plan

An improved method of producing nitrogen has been devised by the Norwegian chemical firm, Norsk Hydro, which may increase the company's output of nitrogen fertilizers by as much as 25% without any increase in the consumption of electrical current, it is claimed. Research on improved methods has been under way in the company's laboratories for a number of years, it is reported.

The company is making new installations, based on the improved method, at its plants at Glomfjord and Heroya at a cost of about £1,000,000, and these installations are expected to increase the yearly output of nitrogen by 8,000 to 9,000 tons, equivalent to an additional 55,000 tons of nitrogenous fertilizers worth £400,000 on the export market. Further installations, costing £5,000,000 are envisaged, which would increase output by another 30,000 tons of nitrogen a year equivalent to 165,000 tons of nitrogenous fertilizers.

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New Israeli NH_3 Plant

The Israeli Government recently placed an order with Batignolles-Chatillon, French engineering firm located in Paris, for a complete nitric acid plant. The new plant, to be erected in Haifa, will contribute mainly to the production of chemical fertilizers for use in Israel.

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Ill. Hort. Soc. to Meet

The Illinois State Horticultural Society will hold its annual meeting at the Broadview Hotel, East St. Louis, Ill. December 11-13, according to an announcement by Harvey B. Hartline, secretary.

Nat'l Shade Tree Meeting

The 27th annual convention of the National Shade Tree Conference was to be held at the Netherlands Plaza Hotel, Cincinnati, Ohio, August 27-31, with a number of technical papers covering the agricultural chemical field on the program for delivery. These were to include a paper by F. L. Parr, of Parr & Hanson, Hicksville, N. Y., on "How I Operate a Small Tree and Landscape Business;" and another, "Some Shade Tree Pests in the Midwest and Their Control," by Dr. R. B. Neiswander, entomologist, Ohio Agricultural Experiment Station, Wooster.

The final day, August 31, was to be under the chairmanship of Noel B. Wysong, vice-president of the N. S.T.C. Among the papers to be presented was one entitled, "Factors Involved in Injury by Mist Blower D DT Formulations," by Dr. John G. Matthysse and Dan Clower, Dept. of Entomology, Cornell University, Ithaca, N. Y.

The annual banquet was to be held on August 30, and a plant clinic that afternoon. The group planned to visit points of interest to tree men in Cincinnati and surrounding area.

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Conn. Field Day Held

The Connecticut Agricultural Experiment Station, New Haven, held its annual field day August 22, featuring a 100-ft. long display of current research work being carried out by the station. The display included exhibits of the departments of soils genetics, plant pathology, entomology, forestry, and chemistry.

The plant pathology department exhibited a collection of specimens of nematodes found in Connecticut and specimens of plants attacked by nematodes. The entomology department had a similar type of display showing both beneficial and destructive species of insects found in the state.

The soils department demonstrated its findings by displaying corn plants grown on good structure and others grown on soil where the structure was poor. The soils were initially the same and fertilizer treatments were identical. One soil was cultitreated for weed control; the other was treated with 2,4-D and no cultivating was done. The cultivated soil proved to have a much higher tilth index, one measure of soil structure, and the superiority of the corn plants grown on it could easily be seen.

The field day also included tours of the Station's farms and experimental plots.

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Fertilizer Tech Meeting

An all-day meeting on fertilizer technology on August 27 was to precede the joint meeting of the American Society of Agronomy and the Soil Science Society of America at Pennsylvania State College, scheduled for August 28 and 29.

The meeting of Aug. 27 was to include the presentation of technical papers, according to K. D. Jacob, Head of the Division of Fertilizer and Agricultural Lime, Bureau of Plant Industry Station, U.S.D.A., Beltsville, Md. Mr. Jacob was to preside at the morning session. Papers scheduled for presentation were:

"Developments in World Fertilizer Production," G. J. Callister, Food and Agriculture Organization of the United Nations; "Nitric Acid in the Fertilizer Industry," E. D. Crittenden, Nitrogen Section, Solvay Process Division, Allied Chemical & Dye Corporation; and "Chemistry and Technology of Ammoniated Superphosphate," J. C. Sharp, Spencer Chemical Company.

The afternoon session was scheduled to be in charge of W. L. Nelson, North Carolina Agricultural Experiment Station, Raleigh, N. C. Scheduled papers included "Resources, Production, and Consumption of Sulfur in the United States," C. W. Josephson, Bureau of Mines, U. S. Department of the Interior; "Particle Size - Plant Nutrient Relationships in Phosphate Fertilizers," W. L. Hill, Bureau of Plant Industry, Soils, and Agricultural Engineering, U. S. Department of Agriculture; and "Physical Condition in Mixed Fertilizers," Ritchie Taylor, Davison Chemical Corporation.

British Group Invitation

G. F. New, secretary of the "Fertilizer Society" of Great Britain, has contacted *Agricultural Chemicals* so that his organization might be introduced to the fertilizer trade in the U. S. The English society, formed three years ago, is "for the purpose of providing a medium for the interchange of views amongst those interested in the manufacture and use of fertilizers," he explains.

Since there is apparently considerable interest in the society shown by American fertilizer people, Mr. New states that "there must be many (in the U. S.) who would be interested to know of this society's existence and of the publications." . . . Membership is open to persons engaged in or associated with the manufacture of fertilizers. Members receive society publications automatically. The Fertilizer Society is located at 44, Russell Square, London, W.C.1

Among publications listed for sale are the works of some American authorities such as K. D. Jacob, U. S.D.A. Others listed include: "Granulation of Phosphatic Fertilizers, Theory and Practice," by Sven Nordengren; "Placement of Fertilizers," by Dr. G. W. Cooks; "Slurry Dispersion Methods for the Granulation of Superphosphate Fertilizers," by T. J. Procter; and "Research on the Production of Phosphate Fertilizers at the Chemical Research Laboratory," by Dr. F. M. Reynolds.

•

New Pittsburgh Lab. Unit

Pittsburgh Coke & Chemical Company, producer of agricultural chemicals and basic chemicals for industry, has announced completion of the first major unit of its new central research laboratories at Neville Island near Pittsburgh, Pa.

The new unit more than doubles the company's available laboratory space and centralizes a number of research groups previously located at a number of different points on Neville Island.

R. M. Marshall, president of the company, stated that the new laboratories are designed to take care of additional research requirements.

Formulators–Dust Mixers

IN BUYING

For Constant Quality

DDT Technical and Dust Base

BHC Technical and Dust Base

LINDANE Technical and Dust Base

PARATHION Dust Base

2,4-D Acid, Amine, Ester

LEAD ARSENATE Standard, Astringent, Basic

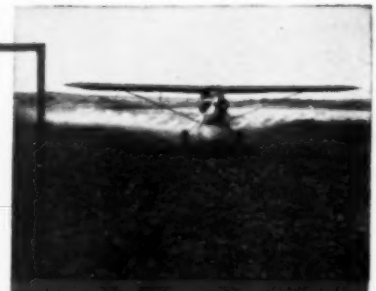
TCA Sodium Salt

POTASSIUM CYANATE Cotton Defoliant and Technical

CALCIUM ARSENATE Standard and Low Lime

DDD Dust Base

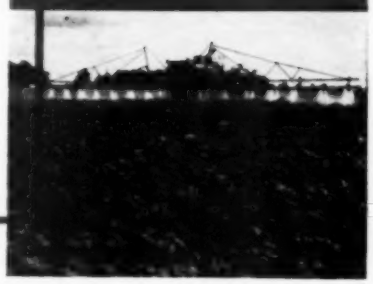
FERMATE Dust Base



BASIC CHEMICALS

GC

FOR AMERICAN AGRICULTURE



General Chemical also makes the famous Orchard* Brand line of insecticides and fungicides

Two generations of America's commercial growers and planters have relied upon General Chemical sprays and dusts. They know from long experience that every product bearing the familiar Orchard Brand shield can always be depended upon for top performance.

ORCHARD BRAND SPRAYS & DUSTS

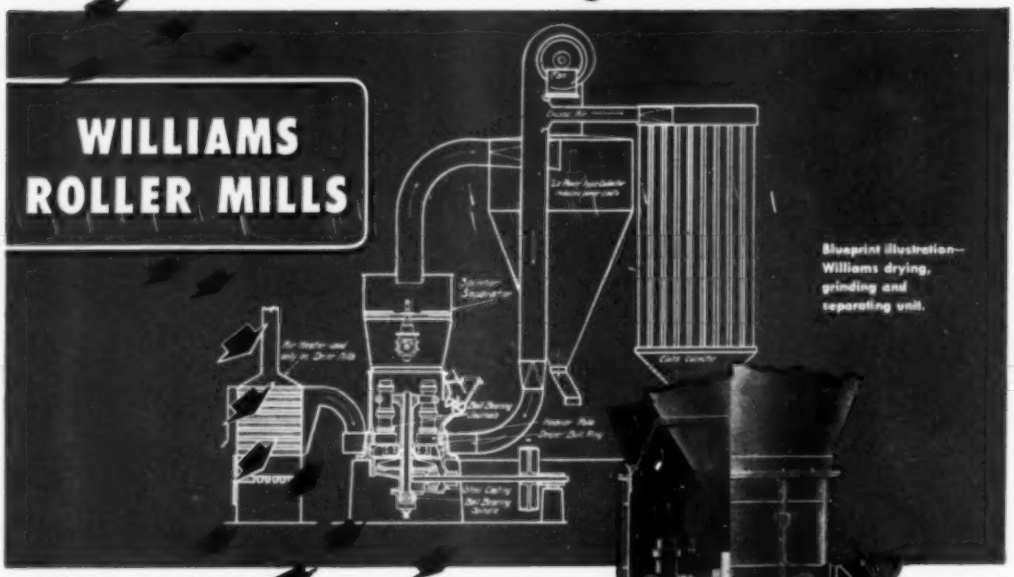
Orchard Brand sprays and dusts include:

Lead Arsenate, Astringent and Standard
Parathion Spray Powder and Emulsifiable Concentrates
Ferbam—Organic Fungicide
Lindane—Spray Powder and Emulsifiable Concentrate
DDT—Spray Powders and Emulsifiable Concentrate
DDT—Dust Base and Wettable Powder
Paris Green
BHC—Spray Powders and Emulsion
Micro-Dritomic* Sulfur—Sulfur Fungicide
Spraycop*—Copper Fungicide
"Puratized"—Mercury Fungicide
Ziram—Organic Fungicide
Genite† EM923—Organic Miticide
Hormone Fruit Sprays
Fungicides for seed treatment

*Reg. U. S. Pat. Off. †General Chemical Trade-Mark

For those Fine Grinding Jobs . . .

WILLIAMS ROLLER MILLS



Blueprint illustration—Williams drying, grinding and separating unit.

200 to 325 mesh Grinding

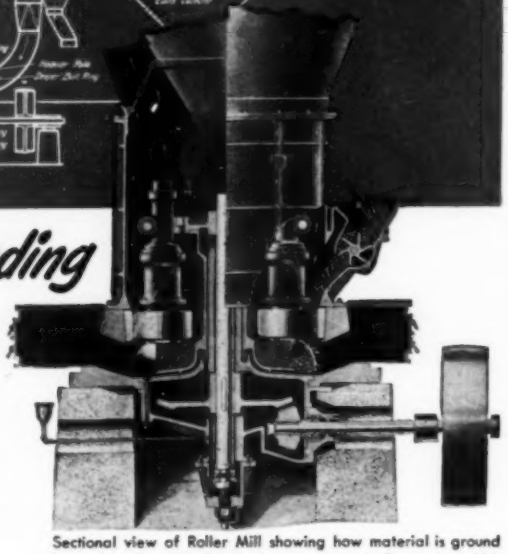
Fine grinding of insecticide powders can ONLY be done economically with PROPER fine grinding equipment and we believe the Williams Roller Mill with Air Separation is the finest mechanical method of material reduction on the market today.

Experienced, engineering know-how, embodied in the design of the unit permits the production of high concentrations of DDT, BHC, Toxaphene, etc., — thoroughly blended. Also pulverizes Pyrethrum, Rotenone, Sulphur for Dusting and Gypsum, Limestone, Rock Phosphate and similar products on an around-the-clock schedule.

Control of product size is assured with the Spinner Air Separator. Finenesses of 98% and 99.9%, 325 mesh are obtainable and can be consistently maintained. A clean, dustless installation from feed opening to finishing product bin, all automatically handled, makes this unit additionally desirable for your plant.

Williams Roller Mills are available in a full range of sizes.

WC-51-1



Sectional view of Roller Mill showing how material is ground between rolls and bull ring, then air swept to Separator which extracts fines and returns oversize for re-grinding.

WILLIAMS ALSO MAKES . . .

Heavy Duty Hammer Mills for crushing and grinding rock phosphate, gypsum, limestone . . . also for disintegrating ammonium sulphate lumps and fertilizer mixes that "set-up" in storage. The Helix-Seal Pulverizer for disintegrating and blending insecticide mixes and concentrations ready for use.

WILLIAMS PATENT CRUSHER & PULVERIZER CO.
2707 N. BROADWAY ST. LOUIS 6, MO.

Oldest and Largest Manufacturer of Hammermills in the World

WILLIAMS

CRUSHERS GRINDERS SHREDDERS

Suppliers' Bulletins

New Toxaphene Bulletin

Hercules Powder Co., Wilmington, Del., has issued a 24 page booklet on *Toxaphene Agricultural Insecticides*. The booklet describes various uses that the insecticide, available in dusts, oil solutions and wettable powders, can be used for, such as cotton insects, livestock pests, against armyworms and cutworms and peanut insects.

•

Bagpak Booklet Offered

International Paper Co., Bagpak Division, New York, has prepared a booklet describing its bag packing machines for use in mixed fertilizer plants. Details are given about the economies involved and descriptions of types of equipment available. Write for booklet 270-D, to Bagpak Division, 220 E. 42nd St., New York 17, N. Y.

•

New Ammonia Paper Out

A new 8-page quarterly journal entitled *Agricultural Ammonia News* issued it first volume on July 20, 1951. Edited by Seton Ross, and published by the Cotton Trade Journal, Inc., Memphis, the paper states that it is the official organ of the Agricultural Ammonia Institute.

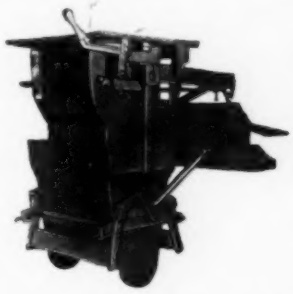
A letter accompanying the first issue says that the paper will carry stories and news about the industry. The second edition is scheduled to come out October 20. Mr. Ross, in the letter, solicits specific news items between 100 and 500 words and asks for photographs of people mentioned in the stories. He stated that he hopes the next issue will be doubled in size.

•

New Bagger Offered

Burrows Equipment Co., Dept. AC, 1316 Sherman Ave., Evanston, Ill., has announced that its new "Apex" bagging scale is now available. The unit, designed for free-flowing materials, requires little space and can be attached to any wood or metal hopper according to the announcement.

The company claims that the machine is equipped with a safety



type grasp for paper or burlap bags. It has a two to one leverage system and the over and under indicator has no springs. A dust evacuating shield encloses the upper portion of the machine and at the top of the unit is a slide control gate to control flow of materials from bins to hopper.

•

Rat Control Manual

Methods of mouse and rat control with warfarin are outlined in a 21-page illustrated manual recently made available to vocational-agriculture teachers, county agents, other farm leaders, and rodenticide formulators by the Wisconsin Alumni Research Foundation, Madison, Wis. The manual, entitled "Rat and Mouse Control, Step by Step," gives recommended methods of rodent control with warfarin and is designed to be used as a guide in projects for vo-ag students, 4-H, FFA, FHA club members and others who may organize local anti-rodent campaigns. Under the plan outlined, displays and demonstrations are worked out illustrating the heavy damage caused by rats and mice, and individual and community action is urged. An 8-page accompanying booklet gives demonstration display ideas. Copies of both manual and booklet may be obtained directly from the Foundation at Madison, Wisc.

Basic warfarin patents are owned by the Wisconsin Alumni Research Foundation. Licensed suppliers of the compound are S. B. Penick & Co., New York, and the Prentiss Drug & Chemical Co., New York. Over 100 brands of warfarin rodenticides, put out by processors and packers in various parts of the country, are now on the American market.

•

NFA Produces Scroll

National Fertilizer Association, 616 Investment Bldg., Washington, D. C. has issued a scroll brochure suitable for framing (14 x 20 inches) quoting Dr. Firman E. Bear, Rutgers University agronomist to the effect that "The fertilizer industry represents the most important advance ever made toward providing plenty of food for the peoples of the earth." The scroll, printed in three colors, depicts a bag of fertilizer being emptied with its contents bringing forth corn, eggs, milk, and fruit.

NFA has also announced the availability of a new 24-page booklet entitled "Fertilizer Use at the Half-Century Mark," a regional survey dealing with the distribution and application of mixed fertilizers and fertilizer materials on individual crops. It puts in easy-reading form statistics on fertilizer use, answering many questions about where and how various grades of fertilizers are used on different crops in certain regions of the U. S. Write for the booklet by name, from National Fertilizer Association, Washington, D. C.

•

"Semesan" Booklet Issued

A booklet, "Seed Treater" has been issued by the Semesan Products division of E. I. du Pont de Nemours & Co., Inc., Wilmington, Del. The eight-page, 2-color brochure tells the story of various methods of seed treating with the company's products "Ceresan" and "Arasan." An article by Dr. T. C. Ryker discusses the addition of insecticides to seed treatment.

BOLL WEEVILS BITE THE DUST

Time was when the boll weevil put the bite on cotton crops in a big way. Planters lost plenty and people felt the pinch of prices.

And now, with cotton serving thousands of military purposes from socks to sea bags, the weevil could sabotage our defense program right in the South's cottonfields. But today there is an effective anti-weevil weapon – Benzene Hexachloride (BHC) which Tennessee makes in large quantities. This is the lethal chemical that goes into dust and spray insecticides to end weevil worries.

Everyone isn't directly involved in the boll weevil battle. Yet every day in some way your life is made more convenient and more comfortable by products from Tennessee.... an industry serving all industry.

TENNESSEE
PRODUCTS & CHEMICAL
Corporation
NASHVILLE, TENNESSEE

To European Meeting

Dr. Walter E. Dove, director of entomological research, U. S. Industrial Chemicals Co. Division of National Distillers Products Corp., is shown as he sailed aboard the Mauretania in August en route to Amsterdam, Holland, to deliver a paper before the International Congress of Entomology. His paper will be on the subject of protecting stored grains against insect infestation. The paper is based on data assembled from experiments with "Pyrenone" protectant, a combination of pyrethrins and Piperonyl Butoxide.

•

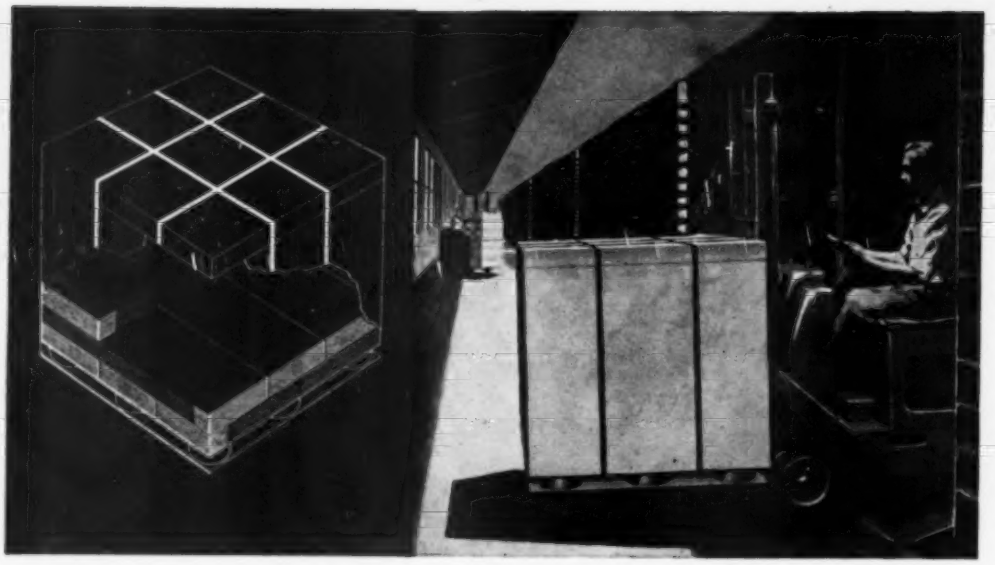
Moves to Larger Quarters

Woodbury Chemical Co., St. Joseph, Mo., has announced its recent move to larger quarters at 702 S. 4th St. According to H. A. Woodbury, president of the company which manufactures insecticides and weed killers, the business has outgrown its former facilities. The company's laboratory remains temporarily at the former address.

•

Rhode Island Field Day

The Rhode Island Agricultural Experiment Station, Kingston, was host to the 20th annual Greenkeepers' Field Day August 22 and 23. In connection, the fifth annual Lawn and Garden Field Day was held on the 23rd. A session on turf culture and weed control was addressed by Dr. J. A. DeFrance of the Station and another session on plant disease control was headed by Dr. F. L. Howard. The recreational program included fishing, golf and a clambake.



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Union Multiwall Specialist

will show you how to make Handling Labor more productive

ONE of the hidden costs in packaging is in the handling of packaging materials from unloading dock to warehouse to packaging assembly line.

Thanks to new ways of shipping and handling, many firms now find savings in handling costs alone more than justify a switch to Union Multiwall Bags. The Union Multiwall Specialist who calls on you, can tell you all about the recent cost-cutting developments in handling of multiwall bags.

He'll show you, too, why more than 300 industries now find Union Multiwall Bags cut packaging costs all along the line—in handling, packaging, shipping—yes, and in better product protection, too.

Even if you're now using multiwall bags, the Union representative who calls on you can give you new ideas to save money. For he is backed by the skilled engineers and packaging experts of America's largest maker of paper bags.

Let him show you how Union resources and packaging experience can help you!

Multiple Protection

Opens Easily

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N.S.D.A. Elects Chapin

In its 6th annual meeting in August, the National Sprayer and Duster Association elected R. B. Chapin president and chairman of the executive board. Mr. Chapin is president of the R. E. Chapin Mfg. Works, Batavia, New York He succeeds C. D. Leiter, sales manager of the F. E. Myers & Bros. Company, Ashland, Ohio who has served as president of the association for the past two years. H. F. Brandt, president of Dobbins Manufacturing Company, Elkhart, Indiana, was elected vice-president of the association and vice-chairman of the executive board. D. P. Lewis, secretary of the H. D. Hudson Mfg. Company, was re-elected treasurer. Frank J. Zink and Earl D. Anderson of Frank J. Zink Associates, Chicago, were re-elected respectively counsel and secretary of the association.

R. G. Merritt, vice-president in charge of sales of Root Mfg. Company, Malta, Ohio, was elected a new member of the executive board to fill an existing vacancy. Re-elected to the board in addition to the officers named were the following: P. L. Hauser, sales manager, Lowell Mfg. Company, Chicago, Illinois; T. M. Burton, vice-president, D. B. Smith & Company, Utica, New York; and C. D. Leiter, sales manager, P. E. Myers & Bros. Company, Ashland, Ohio.

•

Reineck to New Post

Edward A. Reineck has been appointed assistant sales manager for its chemicals department, the Quaker Oats Company, Chicago, has announced. Mr. Reineck has been with Quaker Oats since 1945. He is a graduate of Lawrence College, Appleton, Wisconsin.

•

Fertilizer Plant Opens

E. Rauh and Sons Fertilizer Co., Indianapolis, recently began operations in their new Plymouth, Ind. plant. The plant was built on seven acres of land donated by the Chamber of Commerce, only this year.

DEPENDABLE SHERWIN-WILLIAMS
SPRAY MATERIALS
Complete Line for Fruit Growers

For effective control on apples, cherries, peaches, pears and other fruits, use Sherwin-Williams tested and proven insecticides and fungicides and other spray materials. We have served the fruit growers of America for many years and *will continue to supply* products which our research and experience show are the most satisfactory from the standpoint of effectiveness and economy. Our plant at Bound Brook, N. J., is one of the largest and most modern in the country devoted entirely to the manufacture of insecticides and fungicides.

Obtain your spray material requirements from the Sherwin-Williams Insecticide dealer in your locality. You can depend on the Sherwin-Williams line.

SHERWIN-WILLIAMS SPRAY MATERIALS

- S-W Arsenate of Lead
- S-W Aphamite (15% Parathion)
- S-W Basi-Cop (Tri-basic copper sulfate)
- S-W 50-50 DDT Wettable
- S-W Dimite (Miticide)
- S-W Flo-Mulsion (Dormant oil spray)
- S-W Karbam Black (Ferbam)
- S-W Karbam White (Ziram)
- S-W Mulsoid Sulfur (Micronized sulfur)
- S-W Sulfix Sulfur (Microfine sulfur)
- S-W Safe-N-Lead (Zinc safener)
- S-W Spralastic (Spreader and sticker)
- S-W Spread-Rite (Spreader and sticker)
- S-W Summer Mulsion (Summer oil spray)
- S-W Stop Drop (Naphthalene acetic acid)

THE SHERWIN-WILLIAMS CO.
INSECTICIDE-FUNGICIDE DIVISION

100 Park Ave.
New York City

101 Prospect Ave., N. W.
Cleveland, Ohio

300 W. Lake St.
Chicago

1450 Sherwin Ave.
Oakland, Calif.

Davison Ups Dr. Hubard

The promotion of Dr. Stephen S. Hubard to manager of research of The Davison Chemical Corporation has been announced by Dr. Paul W. Bachman, Director of Research and Development of the Corporation. Dr. Hubard has been with Davison since 1944, prior to which he was with the Johns Hopkins University working on a National Defense Research Committee contract project. He is a native of Lexington, Kentucky, and holds degrees from the University of Kentucky and Cornell University.

•

Named Chem. Supervisor

Industrial Chemicals Division of American Cyanamid Company has announced the appointment of Dr. A. J. Weith as product supervisor in the Synthetic Organic Chemicals Department. Dr. Weith, a graduate of Duke University, joined Cyanamid in 1937.

•

Superphosphate Record Set

Superphosphate production, 18 percent A.P.A. basis, for the first 5 months of this year was 7.7 percent greater than during the same period in 1950, according to The National Fertilizer Association. 5.1 million tons were made from January through May, 1951 — 370,000 tons more than the 4.8 million tons made in the same 5 months of last year.

Production during May, 1951, was 872,000 tons of normal, 3,000 tons of wet-base, and 63,000 tons of concentrated superphosphate. During the month, stocks on hand increased 12 percent for normal and 3 percent for concentrated, but declined 54 percent for wet-base, the NFA states.

•

Operation Wehrenbrecht

H. J. Wehrenbrecht, manager of the Bemis Bros. Bag Co. plant at New Orleans, recently suffered an attack of acute appendicitis. He was released from the hospital on August 15 following removal of his appendix. Recovery was rapid and he was expected back in his office shortly.

New Pennsalt Office

Pennsylvania Salt Manufacturing Co. has opened a new district sales office for its line of chemical products for farm and dairy sanitation, in Dallas, Texas. The new office will be sales and service headquarters for Texas and Oklahoma. Heading this organization will be Hugh W. Temple, district sales manager.

Pennsalt also operates an agricultural chemical plant at Bryan, Texas, where it makes calcium arsenate and other insecticides.

•

Gaylord Chem. Flood Loss

Gaylord Chemical Co., Kansas City, Mo., has estimated its loss to the recent flood, at more than $100,000. The firm has taken up temporary offices in the city but expects to resume its manufacture of fertilizer this fall.

BUFFALO TURBINE MIST SPRAYER-DUSTER

Cuts Man-Hours to a Minimum

COVERS MORE AREA WITH LESS MATERIALS IN

SPRAYING—DUSTING FERTILIZING

The Buffalo Turbine Mist Sprayer-Duster thoroughly sprays, dusts, fertilizes up to 40 acres an hour — all in one operation — one-man controlled! This is the answer to your problems of labor scarcity and cost. Many fruit, field crop, row crop growers, resort owners and city, county and state park superintendents throughout the country report that they've already saved the nominal cost of this unit many times over.

Here are the Features that Prove you will save MONEY — LABOR and MATERIAL

Uses all sprays, dusts in regular or concentrated form and concentrated fertilizers singly or in any combination.

Range: up to 200 ft. horizontally, 125 ft. vertically.

Spray, dust and fertilizer density are easily controlled.

Uses only 10 per cent of water required by conventional rigs — less weight, fewer stops — and you can get in on soft ground.

Round and fish-tail air nozzles are standard equipment.

Nozzle velocity controlled by engine speed.

You get complete coverage in one pass because the high velocity turbulent air, produced by Buffalo Turbine's exclusive axial flow blower, atomizes sprays, dusts concentrates into micro particles that thoroughly penetrate the thickest growth. The fact that air, not water, is the carrier cuts the time wasted stopping for water to a minimum.

PRICES FROM $1200.00 to $2200.00

3 MODELS: JEEP OR TRUCK MOUNTED AND TRAILER (shown)

BUFFALO TURBINE
AGRICULTURAL EQUIPMENT CO., Inc.
GOWANDA, N. Y.

BUFFALO TURBINE
AGRICULTURAL EQUIPMENT CO., Inc.
Dept. AC, Gowanda, N. Y.

Please send me full information on the BUFFALO TURBINE MIST SPRAYER-DUSTER.

Name .....

Name of Nursery .....

Address .....

New Books and Bulletins

The Smut Fungi, by Geo. W. Fischer, plant pathologist, Washington State College. Published by Ronald Press Co., New York. Price, $6; 387 pgs. A complete guide to the literature, with comprehensive bibliography.

Destructive and Useful Insects, by C. L. Metcalf and W. P. Flint, revised by R. L. Metcalf, published by McGraw-Hill Book Co., New York, 1071 pages, illustrated, cloth binding, price, $10.00.

A practical handbook on economic entomology covering the anatomy, mouthparts, development and metamorphosis of insects, the place of insects in the animal kingdom, orders of insects and the control of insects, followed by a coverage of each crop or group of crops and insects relating to them.

The chapter on insect control covers the more recent organic insecticides plus the older compounds with fumigation, repellants and insecticide formulation covered in some detail. Other methods of control besides chemical are discussed in brief detail. Mention is made of legal aspects of insecticides including insecticide laws and legislation. Some discussion on apparatus for application of insecticides is covered.

About half the book is devoted to insects injurious to crops such as corn, small grains, tobacco, vegetable and truck gardens, citrus insects, cotton insects and others. Each chapter contains a taxonomic key that describes damage done to the plant by insects.

Following the key is a comprehensive discussion of the insect, describing the type of damage done, plants attacked, distribution, life cycle and control measures. The insect is either pictured or some of the damage it does is illustrated .

The book is a practical guide for anybody working in the field with insects. It is very complete, well illustrated and presents the information in a very logical manner. Written in such a way that anyone can derive much useful information from it, the book is suitable for any desired depth of study, from the "dirt" farmer to the entomologist.

A Symposium on Copper Metabolism, edited by William D. McElroy and Bentley Glass, published by The Johns Hopkins Press, Baltimore, 443 pages, illustrated with photographs and charts, cloth binding, price, $6.00.

This book contains the papers and discussions presented at the Symposium on Copper Metabolism held at Johns Hopkins University, June 14-16, 1950, under the sponsorship of the McCollum-Pratt Institute. The participants in the discussion were prominent individuals in the field of micronutrients, and numbered 35 in all.

The book covers copper metabolism in plants and animals. Such topics as formation of copper complexes, copper protein, the nature of copper enzymes involved in tyrosine oxidation, phenol oxidase and plant respiration, fundamental aspects of copper in plants and copper nutrition of green plants and fungi are covered in the part of the symposium relating to plants. Animals are covered in such topics as copper metabolism in the invertebrates, copper and molybdenum in relation to diseases of cattle in New Zealand, and copper metabolism in human subjects. Other topics related to the subject, such as radioisotopes in nutritional study and hemocyanins are included.

The book covers both plants and animals, with a slight leaning toward plants. Each paper is illustrated with charts, formulae, and related material. A bibliography of references follows the paper and a discussion of each paper from other members of the symposium is included at the end of each chapter. The papers are technical. Articles definitely not for the layman, much of the reading requiring a knowledge of advanced chemistry for complete understanding.

Bulletin No. E-815, "Preliminary Tests of Some Hydrazides and Hydrazones as Insecticides", has been released recently by the U. S. Dept. of Agriculture. The bulletin, prepared by G. T. Bottger, A. P. Yerington and S. I. Gertler. Three tables are presented, showing the results of tests with 37 hydrazides and hydrazones against Alder flea beetle; armyworm; celery leaf tier, green dock beetle, Mediterranean flour moth, pea aphid and two-spotted spider mite.

Florida Agricultural Experiment Station, Gainesville, Fla., has issued two bulletins dealing with use of insecticides of interest to growers of cucumbers, squash and corn. Bul. 465—"Control of Insect Pests of Cucumbers and Squash," reviews in detail tests of new organic insecticides for control of cucurbit pests and recommends a regular schedule of parathion and lindane. Bul. 466—"Control of Budworms, Earworms and Other Insects Attacking Corn and Green Corn in Florida," offers a basic insect control program to guide both home and commercial growers.

Pesticide Handbook by D. E. H. Frear. Published by the Pennsylvania State College and the University of Maine. 158 pages, 6 x 9 inches, flexible, glazed cover. Price, $1.10.

Almost 4000 trade names of commercial insecticides, fungicides, herbicides, rodenticides, adjuvents, including wetting and spreading agents, diluents, repellents, and plant hormones are listed in this text, which is a continuation of "Pest Control Materials", published in 1949 and 1950. The trade names are listed alphabetically with information on the ingredients, uses and manufacture. Trade names of application machinery are included in the listing with

(*Turn to page* 117)

If there is any bag that positively won't permit dry particles to sift, this is it! Betner's new method of construction combines special liners with folding, glueing and heat-sealing in such a way that there is virtually "No-Sift" for contents. This new Betner bag is perfect for insecticides, fertilizers and other chemicals that must be packaged in sift proof containers. It is also ideally suited for packaging foods. Available in sizes holding from 1 to 25 lbs. of bulk powdered material; can be pre-printed up to four colors; and can be made in several combinations of materials.

and...

Betner can supply the special machinery for closing the "Duo-Tite" bag . . . it heat-seals, double folds and pastes the tops in exactly the same manner as the bottom is constructed.

A complete bag service...

from idea to finished bag to machinery for closing bags and filling and closing liner bags for cartons. Your inquiries are welcome, and samples with full technical information will be supplied promptly.

Benj C Betner Co DEVON, PA.

BENJ. C. BETNER CO., Richmond, Va.; BENJ. C. BETNER CO., of WISCONSIN, Appleton, Wisconsin; BENJ. C. BETNER CO., Paris, Texas; BENJ. C. BETNER CO. of CALIFORNIA, Los Angeles, California; Southern Packaging Corporation, Affiliate of BENJ. C. BETNER CO.

USDA Expands Beetle Area

Extension of the regulated area for control of Japanese beetles to include all or parts of 3 counties in New York, 45 counties in North Carolina, 7 counties in Ohio, and 1 each in Pennsylvania and West Virginia, effective August 14, has been announced by the U. S. Department of Agriculture.

This extension is in line with the department's proposal of June 21, at which time the department said it proposed to add North Carolina to the quarantined area, put more than 40 North Carolina counties under regulation, and also extend the regulated areas in New York, Ohio, Pennsylvania and West Virginia to include important infestations discovered in nonregulated areas in these States.

•

Wash. Conference Nov. 1, 2

H. S. Telford, chairman of the Dept. of Entomology, State College of Washington, Pullman, Wash., reports that the program for their third annual Aerial Dusting and Spraying Conference is now being developed. The conference will meet in Yakima, Wash., November 1 and 2.

•

I.M.C. Sales Up for '51

Net sales of International Minerals & Chemical Corporation for the 12 months ended June 30, 1951, were $66,257,884, compared with $58,402,180 for the previous corresponding 12 month period ended June 30, 1950, an increase of 13%, the company has announced.

•

USDA Assigns Abroad

The U. S. Department of Agriculture has sent a number of its personnel to assignments abroad on the Point Four program. Among recent appointees are Dr. Charles E. Pegg, animal husbandman; Dr. Harold Mowry, horticulturist; and Fred A. Thompson, agricultural engineer.

Dr. Pegg left August 20 for Liberia to assist that government in the field of veterinary medicine. He is a graduate of the Colorado A. & M. School of Veterinary Medicine. He will be located in Monrovia.

Dr. Mowry left August 17 for Costa Rica where he is giving special study to opportunities for agricultural research and service. A native of Kansas, Dr. Mowry received his academic degrees in agriculture from the University of Florida and has been active in civic affairs in that state.

Brazil was the destination of Mr. Thompson who left August 19 for the state of Sao Paulo to serve as an adviser and trainer of instructors in various phases of soil conservation and irrigation. His assignment was made at the request of the Brazilian government to the U.S.

WASHINGTON

(Continued from page 63)

carry out the provisions of the Capehart amendment to the Defense Production Act of 1950. Previously, August 13th had been set as the deadline for five of the manufacturer's regulations including CPR-22, which affected

helping to keep America strong . . .

are her bountiful lands and her millions of farms, expertly operated. In every section of the country . . . and world-wide as well . . . successful agriculturalists depend upon chlordane to insure bigger, more profitable crops. Its ever-widening acceptance, based upon six years of proven performance, has definitely established chlordane as "the insecticide with the bigger payoff". Ease of application, effective control, better residual protection are your assurance of satisfactory results when you use chlordane. For complete details on proper formulations and applications, write

CHLORDANE

VELSICOL CORPORATION

GENERAL OFFICES AND LABORATORIES: 330 E. GRAND AVE., CHICAGO 11, ILL.

EXPORT DIVISION: 100 E. 42ND ST., NEW YORK, NEW YORK

representatives in principal cities

use chlordane. For complete bulletins on proper applications, write

most companies in this industry.

Uncertainty of supplies of basic chemicals required—sulfur, chlorine, benzene, alcohol, sulphuric acid, potash, ammonium sulphate, nitrogen-containing ingredients—poses a serious problem also for planning of 1951-52 output. Supplies of these important raw materials depend for the most part on the degree of intensity of the mobilization effort which in turn depends on the general world situation, with special emphasis on Korea. Sulfur and sulfuric acid will remain a serious problem for another 12-18 months regardless of what happens to the mobilization effort. Availability of other scarce materials will vary with demands by other essential industries for them as well as by whether NPA places them under more rigid distribution control.

* * *

The insecticide industry in general is not well pleased with the 1950-51 season. The demand for corn borer insecticides was poor and, at best, actual consumption of cotton insecticides was generally poor, although fair in some spots. Inventories of finished insecticides and concentrates will be heavy at the start of the new year. Even some technical materials will remain as dead and expensive inventory to be held until the start of the active months in the spring of 1952. Export demand is not expected to drain off any great amount of this surplus.

Technical DDT, however, is the exception to the rule. Following the end of the heavy active domestic season, there existed an unprecedented export demand which showed no immediate sign of abatement. It is expected that the demand will continue for the balance of 1951. Then, demand for the formulating season of early 1952 is expected to create a 'shortage' again.

* * *

An official USDA estimate during August indicated that this year's cotton crop would be about 17,266,000 bales. If this figure is realized, it will be the third largest ever produced in this country. It would be exceeded only by the record crop of 18,946,000 bales in 1947 and that of 17,978,000 bales in 1926. It would of course far surpass last year's abnormally small crop of 10,012,000 bales. The outlook would be for a carryover on August 1, 1952 of about 4,000,000 bales if the distribution of cotton this season should equal the 15,000,000 bales used in the 12 months ended on July 31st.★★

HERBICIDE 1

(Continued from page 55)

bed remained weed free for approximately three weeks after each application during the cutting season. The fourth application applied during the early fern stage controlled weeds for six weeks. Yields of cut spears from the treated plots were 17 per cent greater than from the untreated areas. The higher yield undoubtedly was due to the lack of weed competition in the treated plots because none of the test plots were disked during

cutting. These same plots were carried over a second year and similar treatments were made. To date, weed control has been excellent and no injurious effects from the chemical treatments have been observed.

Performance in Corn

THE success of "Crag Herbicide 1" for controlling weeds in deeply seeded crops was shown in the tests with sweet and field corn. Weed control in most seeded crops is particularly critical at the early stages of development. Very often a crop is too small to cultivate and weeds directly in the row develop at the same rate or faster than the seeded crop; thereby reducing growth of the valuable plants. Thus, a herbicide that could hold back such weeds until the crop was large enough for cultivation would be considered desirable. Thus it was suggested that this new herbicide should be used to destroy germinating weed seedlings.

Tests were made to study the control of such weeds with three applications at three different time intervals after seeding sweet corn (var. Golden Cross) and field corn (var. U. S. #13). Applications were made to separate plots at rates of 2 and 3 lb. per acre on the day of planting; four days following planting when the corn was pushing through the soil; and seven days after planting when the corn was approximately 2 to 3 inches tall. No weeds were visible in the plots until the application which was made seven days after planting. Those present at that time were less than one-half inch in height.

Excellent weed control was obtained when weed germination was allowed to proceed for a period of four days before herbicide was applied. Here again was indicated the ability of the material to control the germinating seedling. Neither the germination nor growth of corn was affected by the herbicidal treatments.

The tests in asparagus and corn have served as examples of the usefulness of this herbicide in weeding established plants and deeply seeded crops. The fact that the material becomes an active herbicide upon contact with soil raises the question of its possible absorption by the roots of crop plants. Normally, "Crag Herbicide 1" does not come in contact with the roots of deeply-seeded or established deep-rooted plants. It is applied to the soil surface and is, therefore, available in its active form to germinating seeds in the upper one-half inch of soil. Only under unusual weather conditions such as heavy rainfall immediately after treating would the herbicide be carried down to a level of 1½ to 2 inches where deeply-planted seedlings such as corn are germinating. In some tests such conditions have been encountered. In these tests, rates of 2 and 3 lb. per acre slowed down growth of the crop seedlings for a few days, but, within a week or ten days they had recovered and were

Solubilizers for 2,4-D and 2,4,5-T

DOUBLE CHECKED

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Sharsol 193
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Solubilizer for 2,4-D and 2,4,5-T acids. Sharsol 193 can be used to produce high or low concentrations of either acid—up to 6 pounds per gallon of 2,4-D; up to 5 pounds per gallon of 2,4,5-T.

Sharsol 193 concentrates have low freezing points.

6 pounds 2,4-D/gal. does not crystallize at —50°F.
4 pounds 2,4-D/gal. freezes at approx. 8°F.
5 pounds 2,4,5-T/gal. freezes at approx. 0°F.

Resolubility of the 2,4-D concentrates which have frozen is excellent since they go back into solution without agitation.

Sharples Report 50-1 is available upon request.

Sharsol 216
(ISOPROPYLAMINE)

An inexpensive solubilizer for 2,4-D acid. Concentrates of over one pound 2,4-D acid per quart may be made. Freezing point of such concentrates is approximately 27°F.

Sharples Report 50-2 is available.

A special mixture of these Sharsols is also available.

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growing at the same rate as the untreated seedlings.

This slowdown of growth is not common. It is an exception occuring under conditions of heavy rainfall in light sandy soils when the herbicide is applied immediately after planting. If weed emergence permits, delaying the application until the crop is emerging reduces this hazard to seeded crops.

"Crag Herbicide 1" is also being tested with promising results in other crops such as mint, seeded onions, potatoes, and sugar cane. Its use in established plantings, such as grapes, blueberries, and raspberries has also been reported. Although not suggested for use in seeded onions because of their similarity in size and depth of planting to weed seeds, it has been used successfully following cultivation after the plants were beyond the knee stage.

The value of the herbicide in controlling weeds in strawberry plantings has been reported by experiment workers throughout the country. It was commercially available this year in development quantities for use in this crop. Greatly increased production is being planned for the 1952 growing season.

Summarizing the research and field data, the following points can be made:

1. "Crag Herbicide 1" is a germinative seed toxicant. At the suggested dosage of 2 to 3 lb. per acre (mineral soils), 5 to 6 lb. per acre (organic soils) it kills weed seeds in the process of germination.

2. It is activated only upon contact with soil and is, therefore, harmless to foliage at suggested concentrations, affecting plants only through the root system.

3. It kills or stunts most shallow planted seeds during germination, but usually does not affect deeply planted large seeds or established deep-root plants.

4. It controls such weeds as chickweed, lamb's quarters, purslane, redroot, and carpetweed; and annual grasses such as crabgrass, and foxtail, at the suggested rates of application, for periods of two to four weeks depending upon climatic conditions.★★

LEGISLATION

(*Continued from page 35*)

Are these extreme proposals considered necessary by the scientific worker?

The Agricultural chemicals industry is already investing at least eight million dollars annually to search out and develop their products; but if the recently-proposed unrealistic requirements are put into effect, the cost of developing a pesticide would become prohibitive and funds and activities would be directed elsewhere.

The manufacture of agricultural chemicals is a part of the U. S. chemical industry, and it is a relatively simple matter to convert raw materials, now used for pesticides, into other chemical products, free of the taint of unjust public criticism.

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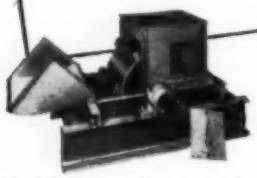

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The industry can be driven to such action, if proponents of excessive legislation sell their ideas to the public.

In their efforts to establish more controls over agricultural chemicals, the extremists claim that present laws and controls are inadequate.

Competition has increased the importance of public goodwill in the U. S. The maintenance of this goodwill acts as a powerful deterrent to unethical action by reliable businesses. Add to this the legal and financial redress against unscrupulous action or misrepresented products, and the charge promoted by extremists, that industry has no curbs, goes up in a puff of smoke.

They completely ignore the fact that the Insecticide, Fungicide, and Rodenticide Act of 1947 requires the registration of pesticides with the U. S. Department of Agriculture before shipment is permitted in interstate commerce; that adequate data must be submitted to substantiate label claims as to effectiveness of pest control and lack of hazard to public health. Seldom do these protaganists mention that if the chemical may involve health, both the Food and Drug Administration and U. S. Public Health Service review the manufacturer's data and both agencies could protest, with effect, the registration of the product by the Department of Agriculture. Since 1938, the FDA has had the authority to establish the maximum amount of pesticidal residues permitted on fresh fruits and vegetables—even though the maximum amount may be zero. FDA has the authority to seize foods if they contain deleterious materials, including excessive chemical residues.

Those who want arbitrary authority over pesticides never publicize the fact that all but seven states have laws governing the distribution and sale of pest control chemicals; and that the agricultural chemicals industry supports the model state bill affecting pesticides, as it was drafted by the Council of State Governments. *The industry does not oppose legislation as such. It wants controls practicable, realistic and free of arbitrary action by a few.*

What is happening in the pesticides industry illustrates the sort of campaign that is being directed against research in the U. S. More is at stake than is immediately apparent. It involves the training of technicians and scientists as our future national leaders. It is threatening to halt progress by legislating new products out of existence and creating apathy and lack of enthusiastic effort on the part of scientists and industrialists.

Only the research workers themselves aligned with agriculturists and industrialists who realize what is at stake can change this situation. The broad pattern of philosophy toward a controlled national economy, including research, is gaining momentum. Progress is certain to be crushed under the weight of excessive legislation unless prompt and concerted action is taken to protect the foundation of our power—freedom in research.★★

TECHNICAL BRIEFS

(*Continued from page 67*)

others may build up undesirable residues in the soil or cause off-flavors or toxic residues in the crop itself.

Now, however, experiments in New York, California, and elsewhere, make insecticide treatment look like a promising future activity for the commercial seed treater, though there is little basis for expanding into large-scale insecticide treatments yet. The big difficulty is that the best dosage of insecticide for insect control is often more than the seed can stand, and seed injury results. Lesser quantities often do not protect the seed against the insects.

Reports from both New York and California indicate that lindane* is the most satisfactory insecticide material for seed treatment. "Arasan" seed disinfectant, says the New York report, "of the several fungicides tested . . . was found to be most effective in preventing seed decay and in counteracting the toxic effects on the seeds exhibited by the insecticides."

Workers at the New York State Agricultural Experiment Station have developed a tentative specific recommendation for using "Arasan" seed disinfectant with 25% lindane in a modified slurry treatment for beans.

The New York mixture also includes a "sticker" (Methocel) to make the chemicals stick to the smooth surface of the beans. A 4% solution of Methocel is made up ahead of time, and used instead of water in preparing the slurry. One pound of Methocel in 3 gallons of water makes a 4% solution. A mixture of ½ pt. of this solution with one ounce of lindane (25% wettable powder) and 1.3 ounces of "Arasan" is used for each bushel of seed. The "Arasan" and lindane are mixed dry and then added to the Methocel solution.

To apply the New York mixture by the slurry treater method, a 4% solution of Methocel is made up first. To each gallon of the Methocel solution is added 1½ lbs. of "Arasan" SF and ½lb. of 75% lindane (or a full pound of 25% lindane). This is applied with the 46 cc. slurry cups and will treat about 16 bushels.

Because sticking this quantity of material on seed affects plantability or rate of flow, force feed drills should not be used for planting unless a dry lubricant such as graphite is used in the drill box.

As a result of 1950 experiments, California workers report that 75% lindane can be applied with the regular slurry and seed treater in combination with seed disinfectant fungicides. They also have found "Arasan" lindane combinations to be effective.

California reports that there is quite a difference in the way lindane affects various seeds. Sugar beets, for instance, can stand as much as a pound of 25% lindane per 100 pounds of seed. Furthermore, this

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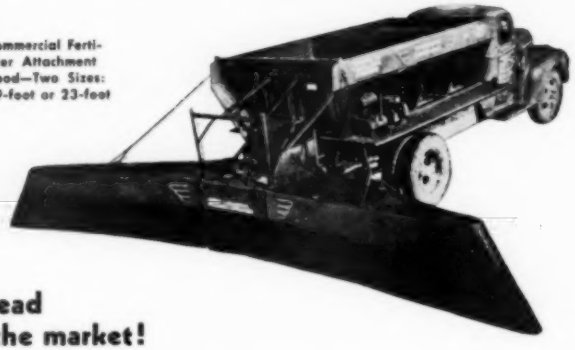

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Conveyor is separately driven from truck drive shaft by a series of V-belts to deliver the correct amount per acre—regardless of truck speed or regardless of whether the truck is driven in low, super-low or any other gear.

Conveyor speed is, therefore, positively synchronized with speed of the rear wheels of the truck and at each revolution of the rear wheels, the conveyor moves a given distance regardless of the truck's speed. Amount of material delivered by conveyor does not vary with hilly or soft field conditions.

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Note: When Spreading Attachment is folded up for road-traveling position, width is approximately 7′-5″.

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amount of lindane produced results. In a field experiment, it killed 93% of the wireworms within the seed area and increased the stand by about 1 plant per foot of row. On baby lima beans, more than four ounces of 25% lindane per 100 pounds of seed may sometimes delay germination, but four ounces is enough to kill 75% to 90% of the wireworms that would endanger the seed. Large lima beans are more sensitive to lindane damage than baby limas. This is particularly true of Fordhook. Two ounces of 25% lindane per 100 pounds is the highest recommendation for large limas, but on Fordhooks even this small amount may delay emergence, and reduce the stand.

Other bean varieties are generally not as sensitive as limas to lindane. Pink beans, kidney beans and Tendergreen beans can generally stand more lindane than Stringless Pole Blue Lake and Giant Stringless Green Pod. Further experimental work is underway by California workers to establish more detailed information.

Milo seed can stand up to four ounces of 25% lindane per 100 pounds. Barley seed has been treated with dust and slurry mixtures of "Ceresan M" combined with four ounces of 25% lindane or more.

Only seed of high germination with good vigor, should be treated with lindane. Poor seed may suffer greater injury. Generally seed should not be treated more than six weeks before planting.—T. C. Ryker, E. I. duPont deNemours & Co., Inc., in the *duPont Seed Treater*, Summer Issue, 1951.

INSECT SITUATION

(*Continued from page 61*)

Spider mites on cotton were on the increase during late July and some treatment was necessary in several South Carolina counties and Arizona. Boll worm populations were high enough in some cotton fields of the New Mexico Pecos Valley to require insecticides.

European corn borer population, and some emergence of the first-brood, occurred by July 19 in the southern part of the Corn Belt and New Jersey. Hatching was in progress in the northern part of the Belt. Indications were that oviposition in the northern areas was higher than in the central and southern sections. It was also indicated that there was a relatively high establishment and survival of larvae.

Codling moth infestation was on the increase in southern Indiana and southern Illinois, but light in the northeastern part of the country. Injurious infestations of the red-banded leaf roller were reported from Massachusetts and New York. Oriental fruit moth infestations were on the increase in some sections, with injury occurring in Ohio and New Jersey. European red mite populations were heavy enough to warrant control measures in some localized

areas of Indiana, New Jersey and Ohio.

The two-spotted spider mite caused serious damage to beans in parts of Utah, Idaho, Washington and California. The pea aphid problem on canning peas was over in most sections due to harvest, but some damage was occurring in Wyoming and Wisconsin. Onion thrips were present in damaging numbers in northwestern Tennessee, Utah and on the western slopes of Colorado.★★

FUNGICIDES

(*Continued from page 59*)

level of the seed and the lower limits of control of the diseases.

Formaldehyde in field tests caused injury at 4.7 gallons per acre on peas, beans, and lima beans. It gave increased yields at 3 gallons per acre, and best results of stand, yield and control of root rot at 1.5 gallons per acre. This would indicate that under our conditions, formaldehyde at about 1.5 to 2 gallons would be the most valuable concentration for further testing.

The Shell product "CHP-55" was effective over a wide range of concentrations. Control was noticeable at as low as 0.2 gallons per acre, and tests up to 2 gallons per acre gave increasing control and did not cause injury under field conditions. Application in "gallons per acre" were calculated on a two-foot row spacing.★★

ACS ABSTRACTS

(*Continued from page 49*)

flax and barley has demonstrated a marked difference between 2,4-D and methoxone, with 2,4-D causing greater plant injury and reductions in yield, even though used at reduced rates as compared with the methoxone.

Swedish experiments have shown that 2,4-D without giving better results against the weeds, damages the cultivated plants more than methoxone. Methoxone is used almost exclusively for weed control in cereals and flax in Sweden, while 2,4-D is used extensively for weed control in waste places. Mixtures of 2,4-D and 2,4,5-T esters have been found useful for brush control.

SOME PROBLEMS OF CHEMICAL WEED CONTROL, A. S. Crafts, Department of Botany, University of California, Davis, California.

In spite of advancements in weed killers, we still need: (1) Temporary soil sterilants to control weeds on crop lands; (2) Permanent soil sterilants to control weeds on railroad rights-of-way, irrigation ditches, air fields, parking areas, etc., (3) Translocated herbicides for controlling perennial weeds.

1. *Temporary soil sterilants* - Inherent toxicity to roots must be high - effective around 1 to 10 ppm in the soil solution. Not highly adsorbed. Volatile or subject to breakdown. Selectively desirable. IPC an example.

2. *Permanent soil sterilants* - High inherent toxicity desirable - 10 to 100 ppm should kill roots. Adsorption an advantage if toxicity not lowered. Chemical should be nonpoisonous to man and animals and resist loss by vaporization or breakdown. CMU an example.

3. *Translocated herbicides* - Against perennial weeds a translocated herbicide must be: (a) soluble or dispersible in a common solvent (oil or water); (b) able to penetrate the plant cuticle; (c) compatible with living mesophyll cells; (4) capable of entering the phloem tissue and moving with assimilates from leaves

to roots: (e) diffusable into surrounding tissues (cambium and root tips) within the roots: (f) accumulatable to toxic levels within these. These 6 requirements involve solubility in both polar and non-polar media, partition such that inward movement is possible, compatibility with living cells (mesophyll) and cell systems (phloem), a high and persistant toxicity such that meristematic (reproductive) tissues are destroyed.

For example, 2,4-D salts are soluble in water but not in the cuticle. Esters are the opposite. The latter penetrate rapidly and kill the leaves; translocation of foods is stopped. The acid penetrates the cuticle slowly, moves through mesophyll, is adsorbed by phloem and translocated to roots where it kills meristems. Of low solubility in common solvents the acid is inconvenient. The heavy esters combine convenience with effective absorption, translocation and toxicity. 2,4-D is selective against broad-leafed weeds; maleic hydrazide against grasses.

The Fertilizer Chemistry Division, with Vincent Sauchelli, Davison Chemical Corp., Baltimore, as chairman and E. F. Thornton, F. S. Royster Guano Co., Norfolk, Va., secretary, heard a number of outstanding papers on the subject. Abstracts of some of these are as follows:

GRINDING OPERATIONS AS THEY AFFECT ACIDIFICATION OF FLORIDA PHOSPHATE PEBBLE. Paul D. V. Manning and I. M. LeBaron, International Minerals and Chemical Corp.

The screen analysis of phosphate rock going to acidulation affects to a major extent the qualities of the superphosphate to be prepared. In general, the finer the grind the more desirable are the chemical qualities of the superphosphate produced. However, there is a major effect on physical properties and the cost of grinding which must be taken into consideration. These variables are discussed and results plotted, showing the effect of the mesh sizes on product characteristics.

While the drying process does not affect the properties of the superphosphate to any great extent unless the drying temperature approaches calcination, the drying affects the grindability of the rock in a major way.

PHOSPHORIC ACID AND ELEMENTAL PHOSPHORUS IN THE FERTILIZER INDUSTRY. W. L. Hill, Division of Fertilizer and Agricultural Lime, Bureau of Plant Industry, Soils, and Agricultural Engineering, U.S. Department of Agriculture, Beltsville, Md.

Phosphorus, inclusive of all its useful forms and derivatives other than ore is in great demand the world over—mainly as a consequence of recent rapid expansion of application and use. Elemental phosphorus is produced by the electric furnace process. Phosphoric acid is obtained by burning elemental phosphorus and by acidulating phosphate rock with sulfuric acid (wet-process). Furnace-process acid goes mainly to the phosphate chemical industry, whereas the fertilizer industry is the largest user of wet-process acid. Thus, the current temporary shortage of sulfur strikes the fertilizer industry doubly hard, in that it not only restricts the sulfuric acid supply for ordinary superphosphate manufacture, but also places in jeopardy the supply of phosphoric acid for the manufacture of triple superphosphate and ammonium phosphate. Adjustments will be necessary, and in anticipation of some of the possible changes it seems appropriate at this time to review current trends in the manufacture, processing, handling, and fertilizer use of phosphoric acid and elemental phosphorus.

QUICK-CURING OF SUPERPHOSPHATE. G. L. Bridger and E. C. Kapusta, Iowa State College, Ames, Iowa.

Studies were made on quick-curing of superphosphate prepared from a Florida rock containing 32.4% P_2O_5 and sulfuric acid. The fresh superphosphate was quick-cured in a small laboratory Roto-Louvre type dryer in which heated air was forced through a bed of superphosphate which was in agitation due to the rotation of the dryer.

When superphosphate made from 71.8% sulfuric acid and an acidulation of 1.81 pounds of sulfuric acid per pound of P_2O_5 (typical commercial conditions) was dried to constant moisture content at product temperatures of 125° to275°F the P_2O_5 availability of the product was 83 to 84%, an increase of only 1 or 2% over that of the fresh material At product temperatures above 225 F, the water-soluble P_2O_5 content of the product decreased. The free acid content did not vary appreciably with product drying temperature. After 30 days storage at room temperature the P_2O_5 availability of the dried products increased to about 88%. Control samples which were not heated had a P_2O_5 availability of about 97% after 30 days storage at room temperature.

The effect of sulfuric acid concentration on P_2O_5 availability of the dried superphosphate was then studied. Acid concentrations as low as 40% sulfuric acid were tried. The P_2O_5 availabilities of the fresh superphosphates were greater when the less concentrated acids were used. In the range 40 to 50% sulfuric acid, the P_2O_5 availabilities of the fresh superphosphates were about 91%, and those of the dried products as high as 94%; as the acid concentration was increased above 50%, P_2O_5 availabilities of the dried products decreased until at 71.8% sulfuric acid, it was only 84%.

The effect of product drying temperature on conversion of superphosphate made with 50% sulfuric acid was studied. Product drying temperatures ranging from 125° to 342°F. were used. At product drying temperatures below about 250°F. a dried product having 93 to 94% P_2O_5 availability was obtained. Above 250°F., the availability of the dried products decreased. The water soluble P_2O_5 content decreased as product drying temperatures were increased above 250°F.

A study of the effect of reactant acid temperature on conversion of dried superphosphate made with 50% sulfuric acid was carried out. Reactant acid temperatures of 70° to 202°F. were used. Use of reactant acid temperatures above 160°F. resulted in a decrease of available P_2O_5 in the dried product.

The effect of acidulation ratio on conversion of dried superphosphate made by using 50% sulfuric acid was studied. Superphosphate made with acidulation ratios of 1.59 to 1.96 pounds of sulfuric acid per pound of P_2O_5 contained availabilities of 84 to 98% when dried to constant moisture at a product drying temperature of 220°F.

In none of the drying experiments was there any cake formation or sticking of the product to the dryer. The product was in granular form, and no excessively large agglomerates were formed.

FUSED GRANULAR MURIATE OF POTASH AND ITS PROPERTIES. E. W. Douglass and E. A. Schoeld, Potash Co. of America, Carlsbad, N. M.

A potash muriate product pioneered by the Potash Co. of America consists of fused salts. The fines or dusty portion of the standard muriate is removed by classification and dried separately. This material is fed to a furnace and melted. The molten product is then chilled rapidly by running on a large water-cooled wheel. The resulting flakes are broken in a hammer mill and screened to desired size. A granular product with about 80% minus 8 and plus 20—mesh is marketed.

Properties of the product are somewhat unusual. Rate of moisture pickup is slower than in the mixture of salts before fusion. Change in absorption is so slow that "set" so troublesome in other salts is practically eliminated. Samples in storage have undergone repeated cycles of dry and moist conditions without showing appreciable set.

Studies indicated that with slow cooling large crystals would be formed, which on crushing showed no difference in set behavior. With rapid chilling of a thin cake the crystals formed were so fine that the material has the appearance of being amorphous. Microscopic studies failed to show crystal segregation, and x-ray powder diffraction methods were used to determine crystal size. Apparently in this material the extremely fine dispersion of the sodium chloride particles

leave the product with the surface properties of a pure potassium chloride.

COMPOUND FERTILIZERS FROM ROCK PHOSPHATE, NITRIC AND SULFURIC ACIDS, AND AMMONIA. M. M. Striplin, Jr., David McKnight, and T. P. Hignett, Tennessee Valley Authority, Wilson Dam, Ala.

A description is given of the pilot-plant development of a process in which rock phosphate is treated with a mixture of nitric and sulfuric acids and the resultant slurry is ammoniated and then dried to produce a fertilizer material that contains dicalcium phosphate, ammonium nitrate, and calcium sulfate. Potassium chloride may be added during processing to produce a granular, homogeneous N-P-K fertilizer. The weight ratio of nitrogen to P_2O_5 in the products was varied from 0.5 to 1.0, and the water-soluble P_2O_5 in the corresponding products varied from about 40 to 10% of the total. Most of the study was concerned with the production of an 11-11-11 fertilizer; 10 to 15% of the P_2O_5 in this material was water-soluble and about 98% was citrate-soluble. The products showed up favorably in tests of crop response, storage, and drillability. Estimates indicate the process to be economically attractive. For the production of equivalent amounts of available P_2O_5, this process requires considerably less sulfuric acid than is required in the manufacture of normal superphosphate.

FERTILIZER MIXING PROBLEMS. Vincent Sauchelli and R. P. Taylor, Davison Chemical Corp.

A review of the various end product, physical and chemical requirements involved in the production of mixed fertilizers: in addition to proper plant food content, storage stability and good mechanical condition are needed to produce desired control of field distribution. Thorough planning and processing are necessary to meet all of these conditions.

Increased difficulties are being encountered in the production of mixes, owing to the reduction of conditioning and filling agents previously used, so that high analyses may be obtained. High analysis raw materials approaching pure chemical salts have increased the effects of reciprocal salt pairs. The increased use of larger particle sized crystalline components and of granulated materials is cited as one means of overcoming poor mechanical and storage conditions. Low moisture contents are also necessary to prevent recrystallization in liquid films.

BATCH MIXING IN THE FERTILIZER INDUSTRY. William T. Doyle and Alfred T. Glynn, Sturtevant Mill Co.

Fertilizer plants, since the birth of the industry, have had mixing as a major function of their operation in producing their product—"mixed fertilizers." Mixing was accomplished in several ways, but usually in a mixer designed for use with those chemicals associated with fertilizer.

Plant operators had thoughts and working models of their ideal mixer which would replace those then in use, that were not particularly suitable for the mixing operation. These early designers included in their group Huntington and Soar who experimented, designed, and developed the early Hunso mixer which was built at Newaygo, Mich.

The batch drum mixer went through changes so as better to handle materials which were available to the industry and also the various ammonia solutions. Our field engineers worked closely with our designers and plant operators in these developments.

Manufacturers of batch mixers realized the need of unit design as suggested in the early 1900's by W. Bell and his engineers at the Newaygo Engineering Co. Our engineers had full access to all of these early designs when the Sturtevant Mill Co. acquired the rights to manufacture the Hunso mixer and the associated machines.

Fungicides Discussed

TOXICOLOGIC STUDIES ON THE ZINC AND DISODIUM ETHYLENE BIS DITHIOCARBAMATES (DITHANES 2-78 AND D-14), R. Blackwell Smith, Jr., J. K. Finnegan, P. F. Sahyeun, H. B. Haag, and Paul

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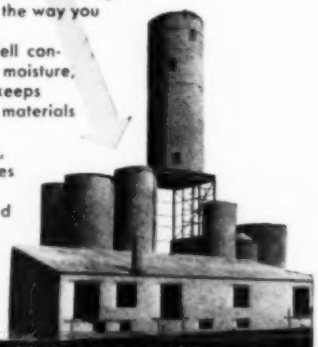

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S. Larson, Depts. of Pharmacology and Surgery, Medical College of Virginia, Richmond 19, Va.

The toxicologic properties of the agricultural fungicides, zinc and disodium salts of ethylene bis dithiocarbamates, are of interest in assessing the possible hazards which may be involved during agricultural use of their occurrence as spray residues. This paper describes results of acute, and chronic studies as well as skin absorption tests.

Disodium ethylene bis dithiocarbamate has an acute oral LD_{50} of about 395 mgm/kg (rate). Zinc ethylene bis dithiocarbamate, in contrast, has an LD_{50} greater than 5200 mgm/kg (rate).

Neither the zinc nor disodium salts are significantly irritating to mucous membranes either in the form marketed or as dilute sprays. Neither of the salts is a notable irritant to the skin of man.

The zinc salt has less than one-tenth the goitrogenic activity reported for the disodium salt. Dietary levels of 10,000 p.p.m. of the zinc salt are required to produce unequivocal microscopic pathology of the thyroid within 30 days, although a trend toward increasing size appears at lower levels. This decreased goitrogenic activity of the zinc salt appears to be due to decreased tendency for its absorption from the gastrointestinal tract.

Results of chronic studies are incomplete. At the end of 74 weeks, there is apparent diminished growth in the females at the 10,000 p.p.m. level and increased mortality in males at levels of 2500 p.p.m. and above.

•

THE FRACTIONATION OF FUNGICIDAL DUST MIXTURES AND SOME OF THEIR INGREDIENTS. J. D. Wilson, Ohio Agricultural Experiment Station, Wooster, Ohio, and Frank Irons, U. S. Department of Agriculture, Toledo, Ohio.

Fungicides have been applied in dust form to plants for the control of foliage diseases for 100 years. However, it was not until the well known "copper-lime" formulation was developed about 35 years ago that dusting for disease control became a common practice. More recently formulations containing a fixed copper and an inert diluent, such as clay, or talc, have come to be more generally used. Whatever the mixtures, they are almost certain to be fractionated to some extent as they are applied to plants now in use, or as they are blown horizontally for some 25 to 50 feet from single-outlet machines. Experimentally, fractionation was studied in a settling tower, an air tunnel, and in the distributor heads of several large dusters.

Particle-size distribution patterns for many of the individual ingredients which are, or might be, used in the preparation of dust mixtures were determined in a settling tower by utilizing the equation of Stoke's Law relative to the rate of fall of small spheres in a viscous fluid. It was found that at least 95 per cent of the particles in most of the materials tested were below 40 microns in diameter, and that about 25 percent were below 2.5 microns. This was especially true for the clays, most fixed copper compounds, and some of the talcs. The average particle size of nearly all of these materials, as determined with a sub-sieve sizer, was from 1 to 10 microns, and it was less than 5 microns in most instances.

Various dust mixtures, and many of the ingredients used in preparing them, were fractionated by gravity so they were drifted the length of a 50-foot air tunnel at the rate of approximately one-half mile per hour. Samples were collected on trays placed at 8-foot intervals on the tunnel floor. These samples were weighed to determine the amount of dust per unit of tray area. Determinations were then made of apparent density, and also of copper content whenever a fungicidal mixture was being tested, to determine the degree of fractionation which had taken place. Variations in weight, density, and copper content were greatest for materials and mixtures with a wide range of particle size, and was least in mixtures where the average particle size of the diluent and the active ingredient were similar. The degree of fractionation which occurred as a finely divided, and a comparatively

coarse, talk were passed down the tunnel is illustrated by comparisons of the weight per unit area, the density, and percentage of copper for the first and last tray samples. When the finely ground talc was mixed with a fixed copper there was a variation of 90 percent in weight, 26 percent in density, and 20 percent in the copper content between samples; whereas the corresponding variations for a similar mixture prepared with the coarser material were 85, 40, and 87 percent, respectively.

Fractionation in the distributor heads of large dusters was measured by collecting the material discharged from each tube in a special dust-collecting device. The samples were then weighed to determine the variation in delivery rates from the different tubes. The amount of dust collected from the tubes of highest delivery was often several times as great as it was from the tubes which delivered the least dust. The more bulky samples were always of greater apparent density than the smaller ones, which indicated that the original mass had been sorted, with most of the larger particles going into the tubes of highest delivery rate. Also, if the mixture being studied contained copper, the percentage of that ingredient found in the samples from the tubes of high delivery was always less than that originally present in the batch sample, whereas it was correspondingly higher in the samples from the tubes of low delivery. This again indicated fractionation. These tests with the large dusters indicated that the degree of fractionation was largely dependent on such factors as the design of the distributor head and how it was mounted with respect to the outlet of the fan case, the speed of the fan, the rate at which the dust mixure was passed through the duster, and the magnitude of the variation in the size of the particles present in the fungicidal dust mixture under observation.

PRESENT STATUS OF FUNGICIDE DEVELOPMENT. John C. Dunegan. U. S. Department of Agriculture, Plant Industry Station, Beltsville, Md.

At the beginning of World War II compounds of copper and of sulfur were the only fungicide materials widely used. At the present time many organic materials are available as the result of cooperation between the chemical industry and the plant pathologist. Screening procedures used to discover possible funcidal properties of new compounds are the first step in this program. They involved a study of action of deposits of the materials before and after weathering on spores of certain test organisms, their phytotoxicity to sensitive test plants, and their compatibility with commonly used insecticides. The reduction of copper and slufur injury and the enhanced control of fungus diseases resulting from the use of dithiocarbamates, organic mercury compounds, and dichloro naphthoquinone represents definite progress achieved during the past 10 years. Thus the cooperative program already has paid dividends in increased production of disease-free food crops but it offers still further rewards in the conservation of materials essential to the Defense Effort. Through the substitution of dithiocarbamates for copper, at least 2 million pounds of metallic copper are saved in the fruit industry alone. Similarly the replacement of sulfur by a dithiocarbamate represents a saving of from 4 to7 pounds, depending upon the dosage rate, of elemental sulfur in every 100 gallons of spray. Such savings are postulated upon the continued ability of the chemical industry to produce the substitute materials. Every effort should be made to insure a continuous and adequate supply of these materials for agricultural use.

NITRIC ACID

(*Continued from page 46*)

is treated with ammonia and carbon dioxide under controlled conditions to precipitate a phosphatic material which appears to have the composition of a carbonate-apatite, $Ca_{10}(PO_4)_6 \cdot CO_3$, and which is completely soluble in ammonium citrate solution. If necessary, the CaO to P_2O_5 mole ratio of the initial solution is increased to the desired range by precipitation of

dicalcium phosphate in a preliminary treatment with ammonia. Treatment of the acid-rock solution with ammonia and sulfur dioxide also is reported to yield a completely citrate-soluble sulfite-phosphate product (2, 5).

The treatment of calcium nitrate solutions with ammonia and carbon dioxide as represented by equation 10 also has been investigated by the Tennessee Valley Authority (*11*).

This treatment and the corresponding treatment of calcium nitrate-ammonium nitrate solutions would appear to yield a more acceptable product for United States conditions than fertilizer-grade calcium nitrate. The nitrogen content of the product could be varied at will to any desired level between 20.5 percent N (Cal-Nitro) and 33.5 percent N (fertilizer-grade ammonium nitrate) by increasing the relative proportion of ammonium nitrate in the mixture. This disposition of calcium nitrate would be equally applicable whether mono- dicalcium phosphates were produced separately, or whether the principal phosphatic material was a mixture of dicalcium phosphate and ammonium nitrate.

Since all of the nitric acid used, with the exception of process losses, eventually is recovered in ammonium nitrate form, the net overall effect is that phosphate rock has been decomposed by carbonic acid, H_2CO_3.

The following generalized reactions indicate the relationships involved in this decomposition as a function of the principal phosphatic material produced.

Carbonate-apatite product,

Where $3/4 < x < 1$

$$Ca_{10}F_2(PO_4)_6 + xH_2CO_3 \longrightarrow x\,Ca_{10}(PO_4)_6CO_2 + 6(1-x)\,CaHPO_4 + 4(1-x)\,CaF_2 + 2(4x-3)\,HF$$

Dicalcium phosphate product,

Where $3 < x < 4$

$$Ca_{10}F_2(PO_4)_6 + xH_2CO_3 \longrightarrow 6\,CaHPO_4 + x\,CaCO_3 + (4-x)\,CaF_2 + 2(x-3)\,HF$$

Monocalcium phosphate product,

Where $6 < x < 7$

$$Ca_{10}F_2(PO_4)_6 + xH_2CO_3 \longrightarrow 3\,Ca(H_2PO_4)_2 + x\,CaCO_3 + (7-x)\,CaF_2 + 2(x-6)\,HF$$

Further variations in x, the quantity of CO_2 or H_2CO_3 required,

$$Ca(NO_3)_2 + 2\,NH_3 + CO_2 + H_2O \longrightarrow CaCO_3 + 2\,NH_4NO_3 \quad (10)$$

and in consequence in the relative proportions of the reaction products will result as the composition of the rock deviates from that of fluorapatite.

Acknowledgment

Grateful acknowledgment is made to Staatsmijnen in Limburg and Norsk Hydro-Electrisk Kvaelstofaktieselskab for permission to publish much of the information in this paper, and to members of these organizations who supplied helpful suggestions.

Literature Cited

1. de Bruijn, H. and Plusjè, M. H.R.J. Process for the Production of Substantially Anhydrous Calcium Nitrate. (vested in the Alien Property Custodian) U. S. Patent 2,375,898 (May 15, 1945).
2. ————————. Production of Phosphate Materials. U. S. Patent 2,555,634 (June 5, 1951).
3. De Directie van de Staatsmijnen in Limburg. Improvements in or Relating to the Production of Calcium Phosphate. British Patent 625,690 (July 1, 1949).
4. ————————. Improvements in or Relating to the Evaporation of Water from Concentrated Solutions of Calcium Nitrate. British Patents 632,580 and 632,633 (Nov. 28, 1949).
5. ————————. Process of Manufacturing a Citrate Soluble Phosphatic Compound, Useful as a Fertilizer or an Ingredient Thereof. British Patent 640,149 (July 12, 1950).
6. ————————. Lowering the Calcium Nitrate Content of a Solution of Raw Phosphate in Nitric Acid. British Patent 653,970 (May 30, 1951).
7. Plusjè, M.H.R.J. Physico-Chemical Investigations on the Treatment of Rock Phosphate with Nitric Acid. Staatsmijnen (Netherlands States Mines), Geleen, The Netherlands. 1948.
8. ————————. Fluorine Removal Process. U. S. Patent 2,504,446 (Apr. 18, 1950).
9. ———————— and de Bruijn, H. Process of Producing a Calcium Phosphate. U. S. Patent 2,555,656 (June 5, 1951).
10. ————————— and van der Zalm, W. Treatment of Impure Calcium Nitrate. U. S. Patent 2,524,174 (Oct. 3, 1950).
11. Walthall, J. H. Chemistry and Technology of New Phosphate Materials. Short course in Fertilizer Technology, University of Maryland, August 21-25, 1950.

BOOKS

(Continued from page 89)

an identification of the equipment and the manufacturer.

As in the previous editions, the second section of the book includes listings of the materials according to use and active ingredients. The third section is an alphabetical listing of manufacturers and their products.

The introduction to this handbook considers briefly the various types of pesticides, and their general uses, and includes a discussion on "How to Use this Book", with reference to the various abbreviations and listings.

BRAZIL

(Continued from page 51)

Toxaphene, at 20%
Octackler, at 3%
Parathion, at 0.5%

BHC proved to be the most effective of the materials tested, and further tests developed that the most efficient concentrations were 1½ and 1%. The Brazilian government

shortly organized the Executive Joint Organization for the Fight against Broca and arrangements were soon made to import BHC for the dusting program, and eventually to encourage local production. The big operation started in 1947, when forty million coffee trees were dusted with BHC. The following year, 1948, saw twenty-five light airplanes in use, as well as ground dusting equipment of all types. Three helicopters were also made available by IBEC, International Basic Economy Corporation, one of Nelson Rockefeller's projects designed to aid the economy of the South American nations.

That year 150 million trees were dusted, and Brazilian planters spent upwards of three and a half million dollars for BHC, with a similar amount being spent on spraying equipment, planes, helicopters, etc. The Instituto Biologico had determined the optimum dusting period to be during the ripening period of the fruits, around October and onward, for about three to four months. BHC loses its effectiveness after about two weeks. Normally, areas are treated twice, the second treatment coming about twenty days after the first.

A helicopter will carry 160 kgs. (about 350 lbs.) of mixed BHC, enough to dust 4,000 trees in a five minute flight and covering an area of about 145,000 square feet. In one day of operation, a helicopter will thus treat 150,000 trees. A Stinson will dust only 40,000 trees per day, while the ground operated dusting equipment, powered with a 2 HP motor, will dust 4,000 trees per day. The same equipment mounted on a small, rubber-wheeled tractor will, in a 15-hour-day, take care of 18,000 trees.

The results with BHC have been so satisfactory and encouraging, that today Brazilian coffee planters consider its use routine. It is now widely accepted, although it was met in the beginning with considerable skepticism, by some planters. Treatment has proved to be so effective that in many areas infestations have diminished so much that only a single dusting is required. Research is continuing, particularly with the odorless purified gamma isomer of BHC. Entomologists at the Instituto are studying the possibility that the characteristic odor of normal BHC may have a repellent effect on the Broca, causing them to break away from contact before the toxic action of the product can make itself effective.

The Ministry of Agriculture is authorizing the expenditure of increasing sums to extend the control program, and with American production of insecticides having expanded so substantially that supplies can now be spared to provision the export market more adequately, there seems to be a good prospect that Brazil's No. 1 agricultural pest is, for the moment at least, under control.★★

Fertilizer Advisory Committee, OPS, Meet

IN a meeting in Washington on August 1, members of the Mixed Fertilizers Industry Advisory Committee told OPS officials the industry could price satisfactorily for the present under the Manufacturers' General Ceiling Price Regulation, CPR 22. The committeemen however, requested that a tailored regulation be prepared for their industry allowing manufacturers to reflect in their ceiling prices certain cost increases beyond cut-off dates provided in CPR 22. These included increased freight rates, cost of imported ingredients not under price control, and possible increases in the prices of their basic materials.

The industry prepares numerous formulations varying in accordance with soil requirements and specifications of state regulatory agencies, using such basic materials as nitrates, phosphates, and potash. One committeeman reported his company prepared 60 to 70 formulations and entered some 500-600 registrations to comply with state regulations.

Committeemen said the old OPA regulation for the industry, spelling out dollars-and-cents prices on standard formulations by zones and subzones, worked satisfactorily. However, they expressed preference for a tailored regulation following the principles of CPR 22 but employing industrywide percentage cost adjustment factors which they would apply to their respective base period prices.

It was suggested that these factors be calculated by zones along the general pattern of the zoning followed during the war. They also suggested provision be made for pricing new liquid fertilizers which are being developed, particularly in California.

Since the industry customarily prices by seasons in the spring and fall, they said it would be desirable to have any new regulation prepared before November, when prices are issued for the spring season.

The committee discussed the type of information that would be required to develop the factors. OPS officials agreed to prepare a proposed questionnaire and submit it to the committee for criticism prior to circulating it to the industry. A new committee meeting was planned soon after the questionnaire is prepared.

It was tentatively suggested that cost studies be developed on the basis of key products rather than on an overall basis.

The meeting was conducted by George W. Strasser, acting assistant director of the Rubber, Chemicals and Drugs Division. Other OPS officials present were: Henry A.

Ruschke, head of the Agricultural Chemicals Section; Cedric G. Gran and Susan M. Phillips of the section staff; Joseph J. Strassman, counsel; Wilhelm Hirschkind, technical advisor, Chemicals Branch; Harold E. Mordan, Office of Accounting; Sam Tannenbaum, Office of Enforcement, and W. R. Thomas, Jr., Office of Advisory Committees.

Members of the committee are: Ray L. King, Georgia Fertilizer Co., Valdosta, Ga.; J. E. Torman, Summers Fertilizer Co., Inc., Baltimore, Md.; B. H. Jones, Sunland Industries, Inc., Fresno, Calif.; C. D. Shallenberger, Shreveport Fertilizer Co., Shreveport, La.; John A. Miller, Price Chemical Co., Inc., Louisville, Ky.; Dewey K. Lange, Lange Bros., Inc., St. Louis, Mo.; W. T. Wright, F. S. Royster Guano Co., Norfolk, Va.; V. J. Leahy, The Baugh & Sons Co., Baltimore, Md.; A. M. Eno, G L F Soil-Building Service, Ithaca, N. Y.; S. L. Nevins, Mathieson Chemical Corp., Little Rock, Ark.; W. B. Hicks,, Wilson & Toomer Fertilizer Co.,, Jacksonville, Fla.; Fred S. Olmstead, Eastern States Farmers' Exchange, Inc., West Springfield, Mass.; J. W. Rutland, International Minerals & Chemical Corp., Chicago; C. C. Arledge, Virginia-Carolina Chemical Corp., Richmond, Va.; and Mac C. Taylor, Oregon-Washington Fertilizer Co., Seattle, Washington.

•

M. F. Ford, St. Regis, Dies

Mason F. Ford, 52-year-old vice-president and director of St. Regis Paper Company, was stricken with a fatal heart attack July 30 in Sao Paulo, Brazil. Funeral services were held in that city.

Mr. Ford, a resident of both Sao Paulo and Buenos Aires, Argentina, for the past 23 years, had served as manager of South American operations for St. Regis, including liaison work with the firm's licensees in those countries.

A native of New York City, his entire professional career was spent in South America. He first was associated in Buenos Aires in 1925 as a commercial attaché for the U.S. embassy following his graduation from Georgetown University's School of Foreign Commerce with a B.S. degree.

•

Lion Report Presented

Lion Oil Company, El Dorado, Arkansas, has issued its report for the first half of 1951, indicating that the company's net income after taxes for this period was equal to $2.45 per share on the 2,340,846 shares now issued and outstanding. This compared to $3.05 per share during the first half of 1950. The difference was attributed largely to a strike in the chemical plant which continued for 36 days during 1951, resulting in a 31% drop in sales.

•

New Marietta Silos

Marietta Concrete Co., Marietta, Ohio recently constructed an addition to the storage system of J. E. Churchman & Sons, Clayton, Del.

Potash in OPS Talk

In a meeting held July 30, members of the Potash Industry Advisory Committee discussed with Office of Price Stabilization officials whether various potash products should be priced under the General Ceiling Price Regulation (GCPR) or under the Manufacturers' General Ceiling Price Regulation. (CPR 22). CPR officials held that muriate of potash is a non-metallic mineral produced by an extractive process and is therefore subject to GCPR. The chemical grade refined by a recrystallization, however, was considered a chemical, and along with sulfate of potash, is subject to CPR 22.

Committeemen indicated that there had been some confusion in the industry about where to price the major product, muriate of potash. Prior to the issuance of Interpretation 33 to CPR 22, a portion of the industry's production had been contracted for under proposed CPR 22 prices.

The question hinged on whether production was an extractive mining process, or a manufacturing chemical process. In some instances, it was reported, the production obtained from predominantly mechanical processes was boosted by supplemental chemical processes.

Committeemen agreed it would be desirable to price the three products under one regulation, and a majority indicated it would be satisfactory to remain for the time-being under GCPR. It was suggested that after Congressional action is completed on extension of price control, the question of a tailored regulation be explored in ample time to provide for next June's contract period if action seems required.

The meeting was conducted by George W. Strasser, acting assistant director of the Rubber, Chemicals and Drugs Division. Other OPS officials present were: T. H. McCormack, division director; Henry A. Huschke, head of the Agricultural Chemicals Section; Cedric G. Gran, Howard J. Grady and Susan M. Phillips of the section staff, Wilhelm Hirschkind, technical advisor, Chemical Branch; Joseph J. Strassman, counsel; Sam Tannenbaum, Office of Enforcement, and W. R. Thomas, Jr., Office of Advisory Committees. Paul E. Callanan, State Department, also attended.

Members of the committee present were:

Horace Albright, president, United States Potash Co., New York; A. Norman Into, vice-president, Potash Division, International Minerals & Chemical Corp., Chicago, Ill.; and George E. Petitt, vice president, Potash Company of America, Washington, D. C.

Members of the committee not present are: W. L. Bradley, president, Bonneville, Ltd., New York; and W. J. Murphy, vice-president, American Potash & Chemical Corp., New York.

•

Miss Engle to C.S.C. Post

Esther A. Engle, formerly in the Technical Service Division of Commercial Solvents Corporation, has been transferred to the Agricultural Division of the company as technical writer in the Terre Haute, Ind. office.

Miss Engle has contributed substantially in the past to the production of the Agricultural Division's technical bulletins, including the comprehensive ammonia manual and the recently issued riboflavin booklet. In addition, she is active in agricultural experiment work, much of which is conducted on her own farms. In her new capacity, she will devote her time exclusively to projects of the Agricultural Division.

•

Goodrich Plans New Plant

A new five million dollar plant is to be built by B. F. Goodrich Chemical Co. in Calvert City, Ky., it has been announced. The new unit will be on a 175-acre tract and will consist of three buildings to house manufacturing operations, service and maintenance, and offices. The company expects to occupy the new premises late in 1952 or early 1953.

Classified Advertising

Rates for classified advertisements are ten cents per word, $2.00 minimum, except those of individuals seeking employment, where the rate is five cents per word, $1.00 minimum. Address all replies to Classified Advertisements with Box Number, care of AGRICULTURAL CHEMICALS, 254 W. 31st St., New York 1. Closing date: 25th of preceding month.

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Sales Representative — Desires new position with manufacturer of agricultural chemicals. At present employed. Has covered East Central states and knows the formulators and others in trade well. Five years in present sales job with manufacturer of basic fungicide and insecticide materials. Graduate chemist. Married. Prefer eastern location but will go anywhere. For further details, write Box No. 561, c/o **Agricultural Chemicals.**

Entomologist, B.S., M.A. — Ambitious young man. Brigham Young University graduate. Extremely high grades. Thorough background entomology. Covered taxonomy, morphology and beneficial and injurious insects. Minored in botany, accentuating plant pathology. Majored biology and chemistry. Married. Address Box 562 c/o **Agricultural Chemicals.**

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To Amsterdam Meeting

W. E. McCauley, entomologist and assistant sales manager of Julius Hyman and Company, Denver, Colorado, attended the Ninth International Congress of Entomology, which met in Amsterdam, Holland, beginning August 21st. On August 22nd Mr. McCauley read a paper before the Congress on "Use of Aldrin and Dieldrin in Soil Widens Scope of Pest Control." Mr. McCauley and Dr. C. C. Compton are joint authors of this paper.

Before returning to the United States, Mr. McCauley expected to consult with agricultural and public health officials in Holland, France and England.

•

Diamond Expands Plant

A two-year, multi-million-dollar program of plant expansion at the Painesville (O.) Plant of Diamond Alkali Company has been announced by Raymond F. Evans, president. The project embraces extensive enlargement and modernization of present facilities which will enable the company to step-up output of caustic soda and chlorine by the electrolytic method.

•

Dr. Hamm to Monsanto Div.

Dr. Philip C. Hamm of Kansas City, Mo., will become a member of Monsanto Chemical Company's agricultural chemicals section of the Organic Chemicals Division development department, it has been announced by the company.

Dr. Hamm holds a B. S. degree in forestry and a Ph. D. in plant physiology from Minneapolis U.

Advertisers' Index

(The Advertisers' Index has been checked carefully but no responsibility can be assumed for any omission)

Tale Ends . . .

DURING the recent Shrine convention in New York, Delbert Myers, a Kansas fertilizer man decided he needed a haircut. Since he boasted a noggin practically devoid of any foliage, he told the barber that the advertised price of $1.25 per haircut was a little stiff in his case, and requested a half price consideration. "There are only eight hairs on my head, and only three of them have to be cut," he explained. But it was no dice. The Broadway clipper held out for full price or nothing.

Mr. Myers then stalked out of the place. "Haircuts are only 60¢ in Wichita," he added, "and only 30¢ for real baldies. What's the matter with New York's sense of proportion, anyway?" he asked.

A recent note in *Time* magazine: "For picknickers who want to know just what they are getting in for, two University of Tennessee graduate students gave some statistical hints from their study of the local bug populations. Every sandwich dropped on their leafy hillside will fall on an average of 102 bugs; a picnic cloth will cover 14,745. Estimated population per acre: more than 40 million chiggers, ants, etc.

•

Robert F. Sherwood, head of the newly-formed Glendon Pyrophyllite Co. could have reason to claim that fate is against him. His company, formerly a division of the Carolina Pyrophyllite Co., took over as an independent entity on August 1, with every expectancy of moving ahead under its new setup. But on the evening of August 1, a severe thunderstorm visited the area and a bolt of lightning struck the plant setting it afire. The blaze quickly got out of control and the morning of August 2 dawned on a little mound of smouldering ashes that only the day before had been the Glendon plant.

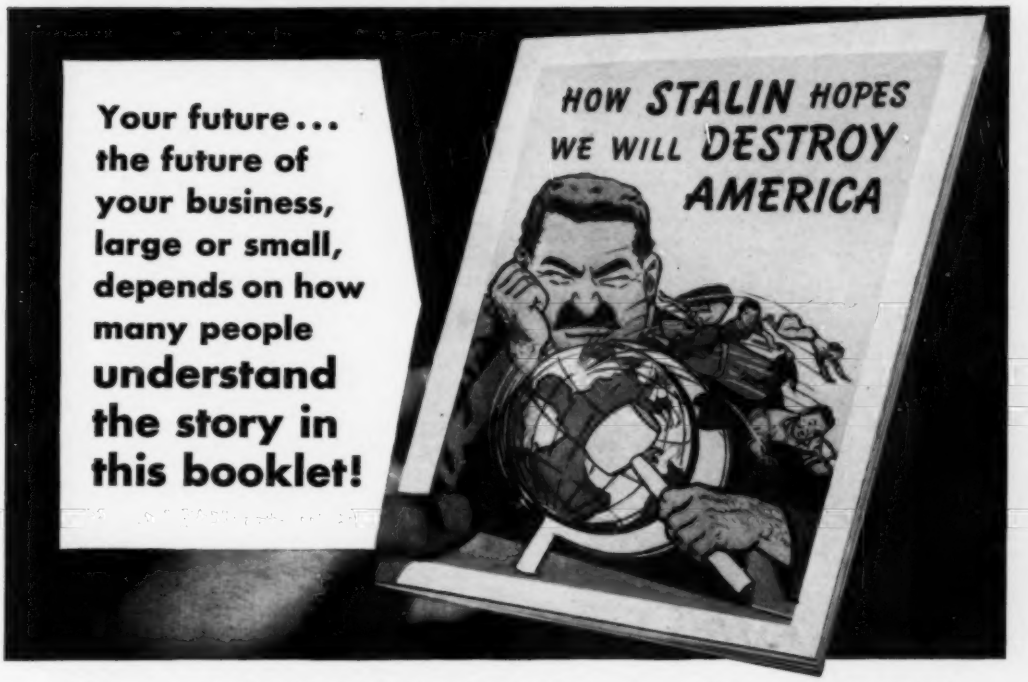
However, Mr. Sherwood states that the structure will be rebuilt immediately and that the company expects to have its product ready to meet next season's demand. The plant is located at Glendon, North Carolina, with headquarters at 10 E. 40th St., New York City.

•

We seem to be having an abnormal amount of difficulty in getting A. E. Poulsen Co. correctly located in their new quarters. In our July issue we reported (in error) their removal from Los Angeles to San Francisco. Last month we brought them back to Los Angeles, but listed their address as 3306 E. Slauson Ave. We learn now with a red face, that it's really 3305 E. Slauson,—across the street.

The Poulsen firm manufactures the "Uni-Blendor" for mixing and blending insecticide dusts. They have been very indulgent in the calm way they have taken our various errors in connection with their address. Hope this is the final correction note.

There IS something YOU can do ABOUT INFLATION!



Businessmen recognize ***inflation*** *as the nation's greatest single threat. But most of us have felt "What can one man—even one business—do to stop it?"*
But there is a way—if enough of us work at it. We can help more people . . . the men and women who work and vote and pay taxes . . . to understand the nature of inflation, its ***causes*** *and* ***cures****. Then we will have gone a long way toward eliminating this pending catastrophe.*

ONE TOOL YOU CAN USE: To help us give our own Bemis workers the inflation picture, we used the colorful, new 16-page booklet "How Stalin Hopes We Will Destroy America" produced by Pictorial Media, Inc. The more widely the booklet is used, the more good it will do . . . and it is available for distribution to your workers, too. It follows the time-proven "comic book" technique . . . dramatizes the dangers . . . and shows how all our citizens can help halt inflation before it's too late.

TESTS SHOW IT HELPS WORKERS: To get an impartial judgment of the value of "How Stalin Hopes We Will Destroy America," it was tested in Bemis plants by the Psychological Corporation under the direction of Dr. Henry C. Link, a foremost research authority. Dr. Link says "Those workers exposed to the booklet were found to have a significantly higher appreciation of the recommended ways to stop inflation than did the workers who did not see the booklet. Details of this test are available upon request." And Bemis factory workers make such statements as "Everything it says hit home, but you'd never figure it out for yourself until you read it"...."It's told in an interesting way so anyone can understand. My daughter, age ten, understood all of it"..."In picture form it impresses you more. Most people don't read about it"..."Had ideas that we wouldn't think about otherwise while we are working away—good book, agree with it—I guess I won't be the only one."

Because we believe this message is growing more urgent every day, Bemis is taking this means to commend to other businesses this weapon against inflation. It is the first of a series of such material that we expect to use.

BEMIS BRO. BAG CO.
St. Louis 2, Missouri

FOR EVERY BUSINESS, LARGE OR SMALL: In quantities, it costs only a few cents a copy—$10.00 for 100 copies, down to 3 cents per copy in larger quantities. Single copy free. For full information, write PICTORIAL MEDIA, INC., Attention: Paul Wheeler, 205 E. 42nd ST., NEW YORK 17, N.Y.

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